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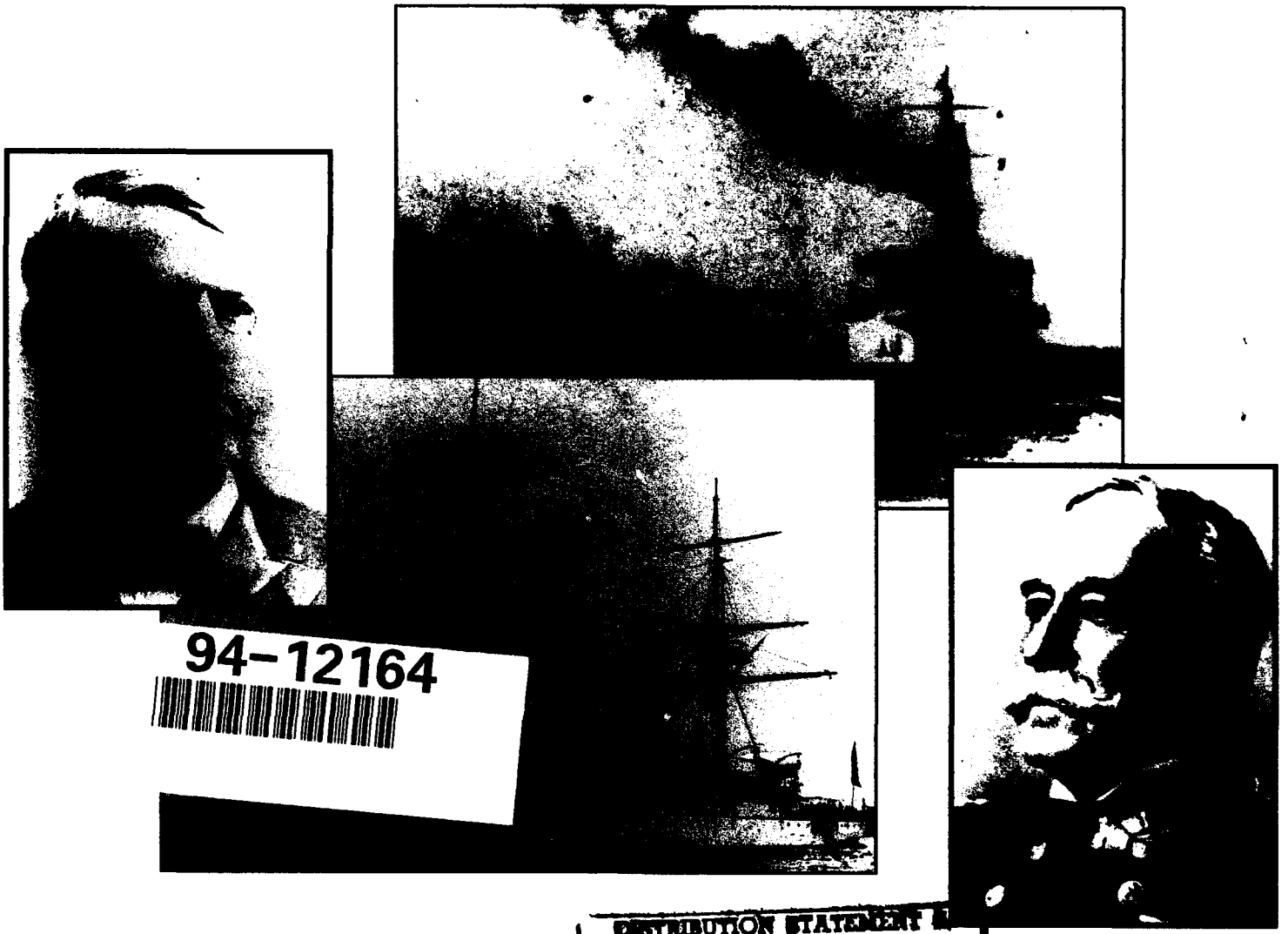
Industrial Development

Reengineering Cost Analysis

Modeling and Simulation



White Squadron to Great White Fleet

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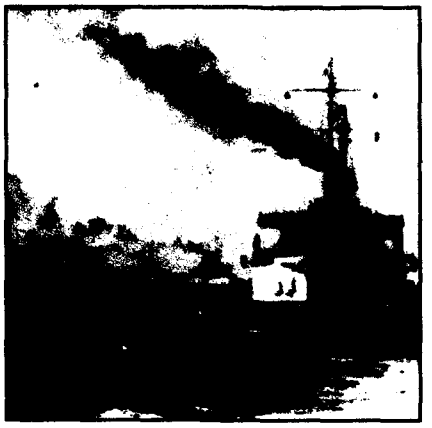

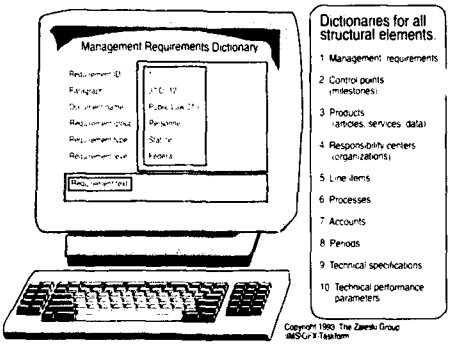

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Whenever masculine nouns or pronouns appear, other than with obvious reference to named male individuals, they have been used for literary purposes and are meant in their generic sense.

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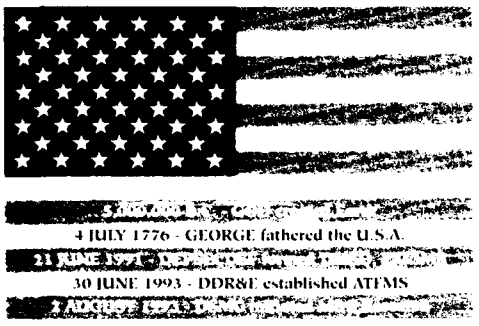
Cover: Photo montage, counterclockwise from left: William Eaton Chandler, Secretary of the Navy (1882-85); protected cruiser USS *Atlanta*, first ship of the New Navy; Admiral George Dewey, hero of the Battle of Manila Bay, Spanish-American War; USS *Connecticut* (BB-18) leads the Great White Fleet on its world cruise, 1907.



ALSO:

ALL-STEAM, ALL-STEEL: WHITE SQUADRON TO GREAT WHITE FLEET

America Acquires a New Navy

Wilbur D. Jones, Jr.

In 1878, Admiral David Dixon Porter, head of the Board of Inspection, reported a grave situation to the Secretary of the Navy. Only 33 cruisers, 13 monitors and two gunboats were serviceable, and conditions were worsening. Two years later, he repeated the warning: America had dropped to rank 12th worldwide in ironclad strength, below Chile. He likened the Navy to a Chinese fort on which "dragons were painted to frighten the enemy away."[1]

The U.S. Navy was a sad, embarrassing lot, replete with creaking, ill-equipped Civil War relics afloat and aching for leadership ashore. Accountability was difficult to find. The Secretary to whom Porter reported, unimpressed, resigned in 1880.

One observer said the status was so discreditable that immediate action was necessary "if the navy was to be saved from total disappearance."[2]

1

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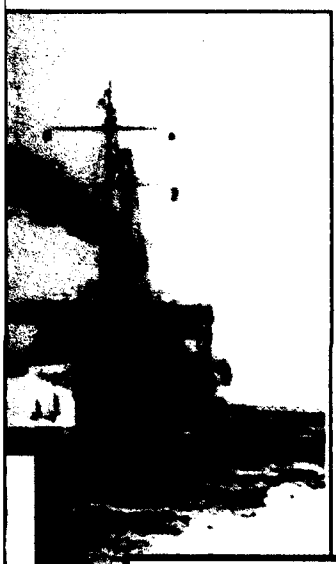
1. William Eaton Chandler, Secretary of the Navy, 1882-85, initiated construction of the New Navy.
2. The protected cruiser USS Atlanta, first of the "ABCDs," the first ship of the New Navy, mid-1880s.
3. USS Connecticut (BB-18) leads the 16-battleship Great White Fleet on the start of its world cruise, December 1907.

Professor Jones is Director of the DSMC Press and Director of the Defense Acquisition Historical Center. This account is taken from research on a book he is writing on the history of defense acquisition. He recommends visiting the cruiser USS Olympia, the only surviving ship of the New Navy, a museum berthed at Penns Landing in Philadelphia.

Research and development was practically nonexistent because technicians believed America should base its development on experimentation of other countries. The shore establishment was inefficient and payoffs in Navy yards were such that some yards were even named for their district congressman.

The Navy's serious state eventually provoked strong voices of indignation, mostly naval officers, to call for reform. Their clamor, fueled by a national expansionist fervor to match the Europeans and encouraged by Congress, would spawn a dramatic passage from wooden sailing ships and iron-hulled gunboats to a modern, world-class all-steam, all-steel "New Navy." *Program Manager* herein examines its birth, infancy and adolescence and the war it won, culminating in the Navy's most historic voyage, the cruise of the Great White Fleet. The story is a continuum of interactions among the Secretaries of the Navy, Congress and industry, and their varying, but steady, impacts on fleet modernization.



All photos courtesy Naval Historical Center, unless otherwise noted.

3

4

4. Admiral George Dewey, the hero of the Battle of Manila Bay, and first president of the General Board.

By 1881, experienced sailors and Members of Congress had sufficiently challenged stagnant naval policy and were beginning to have sway. Through the Naval Institute, for one, and its *Proceedings*, officers aired their dismay over the paucity and obsolescence of the fleet and suggested changes, but struggled to gather a consensus for its proper purpose, size and organization.

When James A. Garfield became president in March 1881, the public was warming to naval expansion to support a more active foreign policy. Navy men believed the competitive race for international markets "would surely become a struggle for survival in which sea power would prove decisive."[3] The U.S. world trade had grown rapidly, and exports had tripled in 10 years. The treasury had a $100-million surplus, and it was time for a larger fleet to protect the national merchant marine.

America continued looking westward while anchoring its Atlantic hemispheric interests. The mood for national security was defensive only to protect from invaders and coastal raiders. "Not that isolationism was dead," a historian noted, "the posture of defense remained so firmly entrenched that most officers continued to think in terms of a peace navy."[4] But most observers agreed to the thesis that national security depended wholly on armed might and a new Manifest Destiny.

For National Safety, Economy and Honor

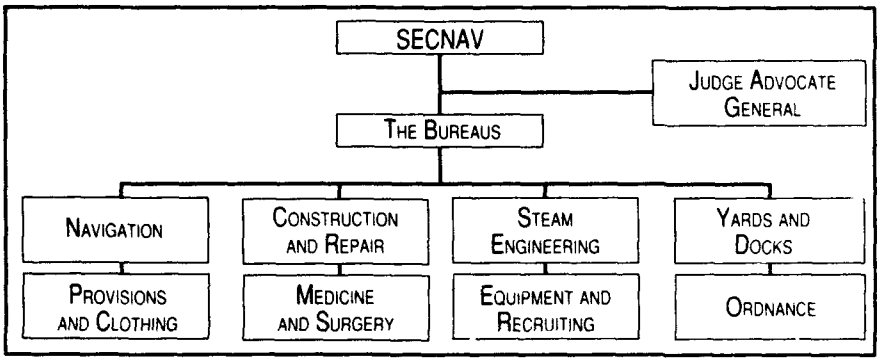
> *National safety, economy, and honor imperatively demands a thorough rehabilitation of the navy.*[5]
>
> **—President Chester A. Arthur, 1882**

Garfield started naval modernization under his Secretary of the Navy (SECNAV) William Henry Hunt, a Louisiana federal judge, in 1881.* Urged by Porter, Hunt formed a Naval Advisory Board, called "naval assistants," headed by Rear Admiral John Rodgers. Hunt directed the Board to advise him on the number of vessels to be built and their classes, sizes, machinery, displacements, material, form of construction, equipment, rigging and internal outfittings. Formation of this Board on 4 March 1881 is recognized as the beginning of the "New Navy," a term which immediately stuck with the press and public.

In November 1881, the Board proposed an immediate sweeping program which Hunt supported before Congress. It included construction of 18 steel cruisers and an assortment of 50 warships of other fabrication. An eight-year program called for 116 warships, including 21 armored cruisers, but the numbers were too large for the country to take at once. So, in 1882, Congress authorized only two cruisers without funding them, but did establish a Naval Board of Advice and Survey to supervise and design the construction. The legislation marked a significant departure point from the Old Navy as Congress barred spending funds to repair wooden ships when the estimated cost was in excess of 20 percent of that for a new ship of the same size and material. Money saved was to be spent for building "two steam cruising vessels of war" of domestically manufactured steel.[6] The administration was so embarrassed

* *Hunt's appointment was typical of the Secretaries of the times, satisfying political constituencies and the President's needs, but without naval experience.*

Organization of the Navy Department - 1887



at the neglectful state of the Navy it assigned the bad-news bearer, Hunt, as ambassador to Russia.

In 1882, President Chester A. Arthur, who assumed the office on President Garfield's assassination, appointed a new SECNAV, William Eaton Chandler. Chandler named a second Board chaired by Commodore Robert W. Charles Shufeldt to revisit the issues. Its recommendation was modest but successful, and urged constructing three steel-protected cruisers and a dispatch vessel. In the 1883 Naval Appropriations Act which funded them, Congress directed the ships use the latest inventions and advertised bids, inviting "all engineers and mechanics of established reputation and all reputable manufacturers of vessels, steam engines, boilers, and ordnance having or controlling regular establishments and being engaged in the business...."[7] Congressional intervention in rebuilding the Navy was underway and would increase in magnitude and frequency.

Construction problems were formidable. American steel mills could not roll plates suitable for cruiser hulls and Navy shipyards could not build steel ships. Chiefs of the Navy Bureaus of Construction and Repair and Steam Engineering, jealous of prerogatives, refused to provide finished designs. Consequently, Chandler advertised for bids from private firms, but awarded construction of all four vessels to one firm, John Roach of Chester, Pa., the low bidder on each.

These four steam vessels, though limited, marked the beginning of the transition to an all-steel Navy. The cruisers *Atlanta*, *Boston* and *Chicago* and the dispatch (communications) vessel, *Dolphin*, together were quickly nicknamed the "ABCDs." The ABCDs, also rigged for a partial sail, had double hulls and watertight compartments and were fully electrified. With the gunboat *Yorktown*, the ships became the first unit deployed to operate together under newly developed tactics and were called the "White Squadron."

The ships were admired at home but were puny by foreign standards. *Chicago* displaced 4,500 tons, mounted a main battery of four modern 8-inch rifles, measured 325 feet, had twin screws, four two-cycle compound engines generating 5,000 horsepower for a top speed of 18 knots, and was rigged as a barkentine. Her brig-rigged lighter sisters had less speed and guns. "Obsolescent when built, they were always more significant for their effect on the navy and its industrial base than for their direct contribution to U.S. sea power."[8] Noncompetitive, yes, but America finally was in the naval race.

The Guiding Hand of Congress and Other Organizational Interference

> *It makes no difference with me...whether the Administration is Democratic or Republican and it seems to me that it ought not to with any other gentleman. It is a great national question what sort of Navy we should have.*"
>
> **—Hilary Abner Herbert (D-Ala.), Chairman, House Naval Affairs Committee, 1890**

Until the late 1880s, the Navy Department was being administered as it had been since 1842. The President had overall responsibility which he delegated to his civilian Secretary. The Secretary personally directed the Navy with advice from flag officer or senior captain chiefs of the technical bureaus.

Dispatch vessel USS Dolphin, one of the ABCDs, in New York harbor, ca. 1890.

Rear Admiral Stephen Bleecker Luce, ca. 1888.

Officers of the USS Boston, 1888

The SECNAV had no professional operations advisor or planner and, without operational or technical experience, frequently was left to reconcile differences between the decentralized and competing or feuding bureaus, while defending himself from Congress or other partisan politicians. The Secretary was the ship and weapons acquisition executive, ordered ship movements, dealt with Congress, reviewed contracting and other processes, and could become immersed in personnel or administrative matters endlessly. Planning was simply asking Congress for something at appropriation time.

In 1890, the Navy filled the position of Assistant Secretary for the first time since the Civil War, and the occupant thereafter shared much of the administrative burden. President Grover Cleveland's second Secretary, Hilary Abner Herbert, gave Assistant Secretary William McAdoo general supervision over repair and construction activities in the Navy yards, boards of survey and investigation, and the Naval War College.

Deference to Congress was an easy path. Congress, particularly the House and Senate Naval Affairs Committees, intervened continuously and in many respects ran the Navy. Ship authorizations and other legislative actions could occur at any time. Committee chairmen and powerful members had to be consulted and pleased. During most of the New Navy era of the 1880s-90s, the Republicans controlled the presidency and Congress. Sometimes the two branches of government cooperated, and sometimes they did not.

An example of the convoluted situation the SECNAV faced when dealing with the Department's institutions was the Board of Construction. Commissioned in 1886 to propose ship characteristics for his approval, the Board was composed primarily of bureau chiefs who would convert approved characteristics into completed designs. In effect the chiefs proposed items they would have to implement and were biased accordingly. In arbitrating differences, the Secretary had no one to turn to for technical advice but the same chiefs.

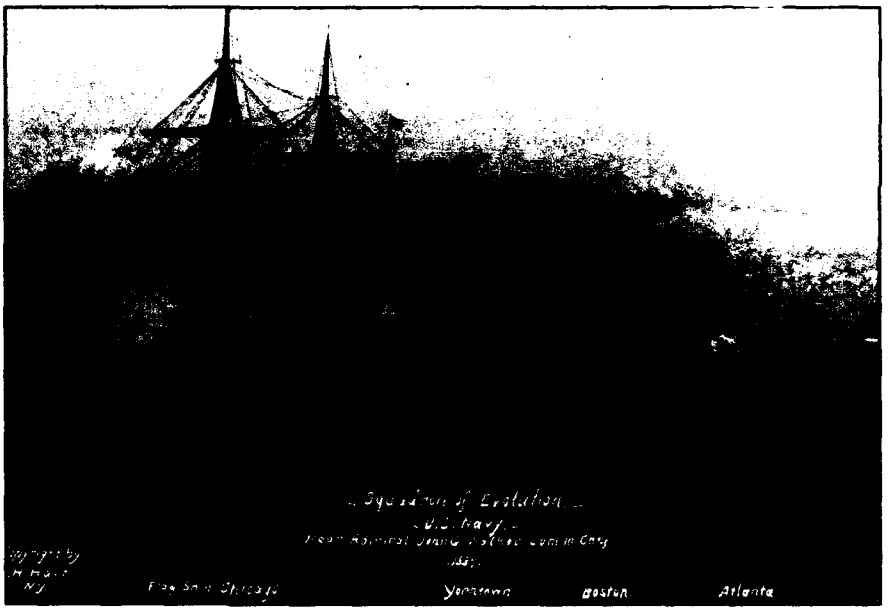
The reader remembers the period was greatly influenced by the emotional question of U.S. expansionism (i.e., imperialism) vs. isolationism. Add competition with the European powers and the emerging Japan for colonies and international markets, and America's insistence on the Monroe Doctrine for ensuring its hemisphere, and we had a still young Nation seeking to find itself in the global order. Some questions were answered by winning the Spanish-American War in 1898 and electing presidents generally endorsing the expansionist theme, but the era of international jousting halted only with the World War in 1914.

Secretaries During the Era of the New Navy

William Henry Hunt, 1881-82 *(James A. Garfield Administration)*
William Eaton Chandler, 1882-85 *(Chester A. Arthur)*
William C. Whitney, 1885-89 *(first Grover Cleveland)*
Benjamin Franklin Tracy, 1889-93 *(Benjamin Harrison)*
Hilary Abner Herbert, 1893-97 *(second Cleveland)*
John Davis Long, 1897-1902 *(first and second William McKinley)*

All administrations were Republican except the Democrat Cleveland's.

The SECNAVs faced frequent testings of will in managing the Department. The tenures of the multiple "Fathers of the New Navy," as historians anoint each Secretary,* are characterized by the their inexperience in naval matters, bitter departmental and partisan politics, outright or alleged corruption, lack of a policy-making mechanism, departmental inefficiencies, incessant congressional involvement, and bureau jealousies, infighting and lack of cooperation. That the Navy propelled into world status is a tribute to the Secretaries and the confidence shown them by their commanders in chief. The achievement also recognizes the contributions of Congress and a number of naval officers, and is a credit to American marine engineering and industrial development.



The "White Squadron," or Squadron of Evolution, 1889, comprised of (as seen, from left) cruiser USS Chicago, *gunboat USS* Yorktown, *and cruisers USS* Boston *and USS* Atlanta.

Battleships and Cruisers Form the New Navy's Heart

The quality of air in the ship is as fine as the quantity is abundant.[11]

—Commanding Officer, cruiser USS *New York*, early 1890s

Midway into the era, battleships augmented armored cruisers as the heart of the New Navy and soon became its centerpiece. The distinctively American battleship dates from 1890 when Congress approved "three seagoing, coast-line battleships, designed to carry the heaviest armor and most powerful ordnance...to have the highest practicable speed for vessels of their class, to cost, exclusive or armament and of any premiums that may be paid for increased speed, not exceeding four million dollars each."[12]

The ships were *Indiana*, *Massachusetts* and *Oregon*, designated BB-1, 2 and 3. The first two were built by Cramp Company of Philadelphia, and *Oregon* by Union Iron Works of San Francisco. They displaced 10,288 tons, were 348-feet long with a 69-foot beam and 24-foot mean draft, and used triple expansion engines of about 10,000 HP for a speed of 16 knots. *Indiana* came in at this cost:

Hull/machinery (plus armor, premium, cost of trial)	**$4,133,393.10**
Armor for gun protection	**977,134.02**
Armament	**966,567.58**
Equipment	**95,691.45**
Total	**$6,172,786.15**

The monitor was the prototype of the modern battleship as personified in the *Indianas*. The hulls were too modest for their four 13-inch guns, and low freeboard and limited coal storage made them unsuitable for rough Atlantic service. Though the ships were for home defense, *Oregon* proved a sound ocean traveler by steaming from Washington State around the Cape of Good Hope, arriving in perfect condition to fight the Spanish at Santiago, Cuba. Eventually she reached Manila a year after leaving Washington.

Lessons learned from the *Indiana* class allowed designers to improve the follow-on ships. The next, *Iowa*, completed in 1897, had a speed of 17 knots, a higher freeboard and expanded coal capacity, and main and secondary batteries of four 12-inch rifles and eight 8-inch and six 4-inch guns.

The *Maine* and *Texas*, authorized in 1886, contained features that "implied technology had outrun policy."[13] But first, *Texas* had to be designed abroad by the recipient of a $15,000 prize the Navy offered. Built at the Norfolk Navy yard, it was the last U.S. ship of European design. Her


SECNAV William C. Whitney, 1885-89.

* On who was the most instrumental, Admiral Bradley A. Fiske wrote in 1920: "Nobody was the father of the new navy. The new navy was the child of public opinion created by navy officers."[14] The reader will want to add, "and by six secretaries of the Navy as well."

Scenes on board the cruiser USS Atlanta, the first of the "ABCD" steel ships, ca. 1886.

keel was laid in 1889 but it was not ready for service until 1895. The *Maine* and *Texas* displaced more than 6,000 tons, steamed at 18.5 knots and carried the heaviest American guns, four 10-inch rifles, yet approved. Its guns distributed over two decks. *Texas* was the first American ship since *Monitor* to have turrets. Both ships were originally designated second-rate battleships but were reclassified as armored cruisers. *Maine* was designed with three masts and sails for endurance but they were discarded while under construction, severing a link to wind-driven warships.

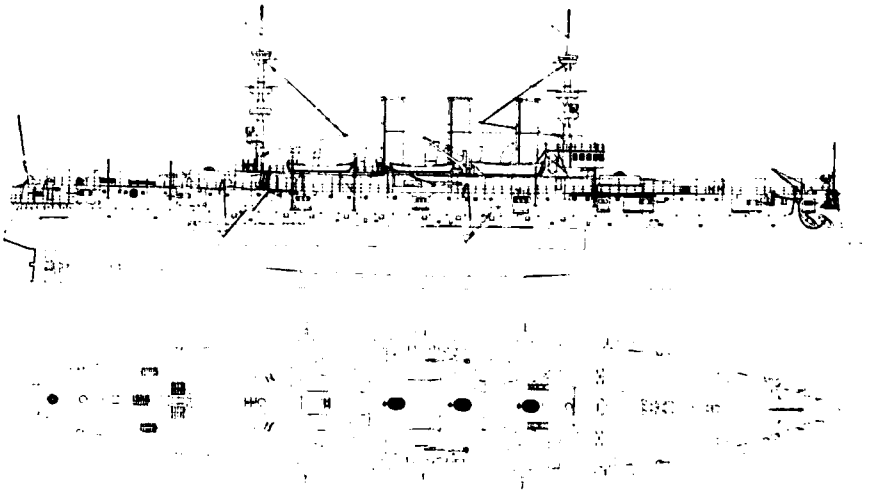
In 1888, in the largest appropriation since the Civil War, Congress authorized the first armored cruiser, *New York* (C-5), at 8,000 tons the heaviest warship laid down in America before 1890, and the 6,000-ton protected cruiser *Olympia* (C-6), destined for Spanish-American War fame. The three *Charleston* cruisers authorized were designed without sail, dealing the Old Navy its *coup de grace*.

New York was one of the Navy's steadiest and most seaworthy ships. Her length-to-beam ratio of 5.9 to 1 allowed a gentle roll, and her gunners consistently scored high. Four fan blowers on the berthing deck provided ventilation. Two coil evaporators provided distilled and potable water with a daily 10,000 gallon capacity, and a dense air ice maker made one ton of ice daily.

The Service built other warships. The steel torpedo boat *Cushing*, at 105 tons and a speed of 22.5, in 1890 was the first of 35 purchased for the New Navy. Destroyers, designed to replace the smaller torpedo boats and protect the capital ships, were introduced at the turn of the century and were the first U.S. ships to use turbine engines. *Bainbridge* was the lead ship. The Navy also built or converted colliers, tenders and other auxiliaries, but not enough, as the war and the Great White Fleet cruise would show.

The potential of submarines aroused interest and Whitney advertised a contest for a design. Builder John P. Holland approached the Navy with his submersible, but Tracy reallocated the submarine appropriation to complete

The Cruiser USS New York



Source: Wood, *U.S. Armored Cruisers*

Battleships of the New Navy

BB No	Jan 1 1907 Battleships First-Class Name	Length Overall	Breadth	Officers	Men	Displacement (Tons) (Normal)	Horsepower	Speed (Knots)	Year of Commission	Main Battery		No. of Guns in Secondary Battery
										in Turrets	Broadside	
1	Indiana	351	69	26	580	10.288	9 607	15 55	1895	4-13 in 8-8 in	4-6in	29 guns
2	Massachusetts	351	69	35	580	[illegible]	10.240	16 21	1896	4-13 in 8-8 in	4-6 in	32 guns
3	Oregon	351	69	35	580	10.288	11 037	16 79	1896	4-13 in 8-8 in	4-6 in	29 guns
4	Iowa	362	72	35	617	11.346	11.933	17 09	1897	4-12 in 8-8 in	6-4 in	30 guns
5	Kearsarge	375	72	39	651	11 520	11.788	16 82	1900	4-13 in 4-8 in	14-5 in	34 guns
6	Kentucky	375	72	35	651	11.520	12 179	16 90	1900	4-13 in 4-8 in	14-5 in	38 guns
7	Illinois	375	72	34	656	11 552	12.757	17 45	1901	4-13 in	14-6 in	28 guns
8	Alabama	374	72	34	679	11 552	11.207	17 01	1900	4-13 in	14-6 in	29 guns
	Wisconsin	374	72	34	669	11 552	12.452	17 17	1901	4-13 in	14-6 in	28 guns
10	Maine	394	72	35	772	12 500	15.603	18 00	1902	4-12 in	16-6 in	24 guns
11	Missouri	394	72	40	740	12 500	15.845	18 15	1903	4-12 in	16-6 in	20 guns
12	Ohio	394	72	41	759	12 500	16.220	18 00	1904	4-12 in	16-6 in	24 guns
13	Virginia	441	76	40	772	14.948	19.000	19 00	1906	4-12 in 8-8 in	12-6 in	42 guns
14	Nebraska	441	76	40	772	14.948	19.000	19 00	1906	4-12 in 8-8 in	12-6 in	42 guns
15	Georgia	441	76	40	772	14.948	19.000	19 00	1906	4-12 in 8-8 in	12-6 in	42 guns
16	New Jersey	441	76	40	772	14.948	19.000	19 00	1906	4-12in 8-8 in	12-6 in	42 guns
17	Rhode Island	441	76	40	772	14.948	19.000	19 00	1906	4-12in 8-8 in	12-6 in	42 guns
18	Connecticut	456	77	41	840	16.000	16.500	18 00	1906	4-12in 8-8 in	12-7 in	50 guns
19	Louisiana	456	77	41	840	16.000	16.500	18 00	1906	4-12in 8-8 in	12-7 in	50 guns
20	Second Class Texas	309	64	30	473	6.315	8.507	17 80	1895	2-12 in	6-6 in	22 guns

Bracket indicates same class of vessel. Total: 20 battleships; 735 officers; 13,947 men; 250,461 tons displacement. Source: Beyer, *The American Battleship in Commission.*

surface ships. Congress took several years before re-funding the submarine. Holland eventually designed and built the first Navy submarine, named for him, in 1900. It displaced 74 tons submerged, was 54-feet long, had a single screw driven on the surface by a gasoline engine, had used batteries and an electric motor for submerged propulsion. The submarine would attack armored ships and smaller ones would defend harbors. Shortly, the Navy had seven gasoline-electric submarines basically of the Holland design, and deficiencies in navigation, ventilation and speed were being overcome.

In 1899, as the era wound down, Congress approved three more battleships — "coastline" vessels of 15,000 tons at an inflated cost of $6.5 million apiece. A few months later they approved two more capital ships. The 1900 cruiser program duplicated the one of the previous year as the Board of Construction sought to modernize the *Olympia*. But the spending spree ended in 1900, when a flowering peace movement in Europe and America convinced the administration to stop momentarily, and no ships were funded that year. The race to create the New Navy had run its course, goal accomplished.

Programming, Authorizing and Administering the Fleet

"Our Pinafore Navy," "Our Useless Navy," "Costly Skeleton Navy," "We are utterly helpless."[13]

—Major periodical headlines about Chandler and Whitney

The following vignettes typify the Secretaries subsequent to Hunt and illustrate how the men used their immense responsibility and authority for good or otherwise.

—William Eaton Chandler

Like each SECNAV of the era, Chandler was fair game and roundly criticized and praised. After awarding the ABCD contracts in 1883, he was in political and ethical trouble immediately and infuriated the other bidders by awarding all contracts to Roach. They accused him of favorable "political liaison" with Roach. The press had a field day and cited the "'contract scandal' as a prime example of corruption in an era noted for political turpitude."[14] The alleged

USS Olympia *(C-6). View of the quarterdeck looking forward, at Boston Navy Yard, 1899. Note 8"/35 gun turret, wooden deck planking and furled awning over centerline.*

Captain Alfred Thayer Mahan, 1894.

misconduct tinged his reputation, but he "displayed a courageous disregard for personal consideration where the welfare of the service was concerned"[13] and later served in the U.S. Senate.

His major achievements were creating the Naval War College in 1884 and technological advancements generated by the ABCDs. "Apathy had given way to enthusiasm and drift to direction. The Navy was moving forward now, despite the inattention of its leaders to strategic requisites."[14] But, one considerable issue was deferred for years: the use of liquid fuel as a part-time coal substitute.

—William C. Whitney

Whitney's task was to revitalize the Service. Recognizing the Navy had no unit sponsoring naval requirements such as war plans and fleet employment, he reorganized the Department into three divisions for more bureau coordination and closer contact with the bureau chiefs, and initiated a new supply and depot policy. In criticizing the ABCD progress, Whitney helped force Roach out of business and into poor health, and the ships had to be completed in Navy yards. All the ships ultimately performed well.

Whitney proposed, and Congress approved in 1885, a significant policy which essentially began the U.S. armament industry. The policy was a compromise between outright public or private ownership of industry, then being considered, and required the government to offer firms attractive contracts to induce them to manufacture basic forgings for delivery to public facilities such as Navy yards, where the material would be tested. Accepted forgings would then be used to make guns and heavy equipment.

Much of the Navy's business was controlled by brokers. Whitney reported that large, independent, sole-source purchases were made by the bureaus where the law intended that contracts, after competition, should be awarded to the lowest bidder. He consolidated purchasing and property accounts in the Bureau of Provisions and Clothing, made the Paymaster General responsible, and established the general storekeeper system. The Judge Advocate General became important in handling the millions in outlays to contractors.

The 30 ships Whitney added "reflected the haphazard planning of officers who grasped the tactical significance of mobility and firepower, but failed to appreciate the strategic advantage inherent in a unified battle force of sufficient strength and endurance to destroy an enemy fleet a thousand miles offshore," said an observer about the Whitney period.[18]

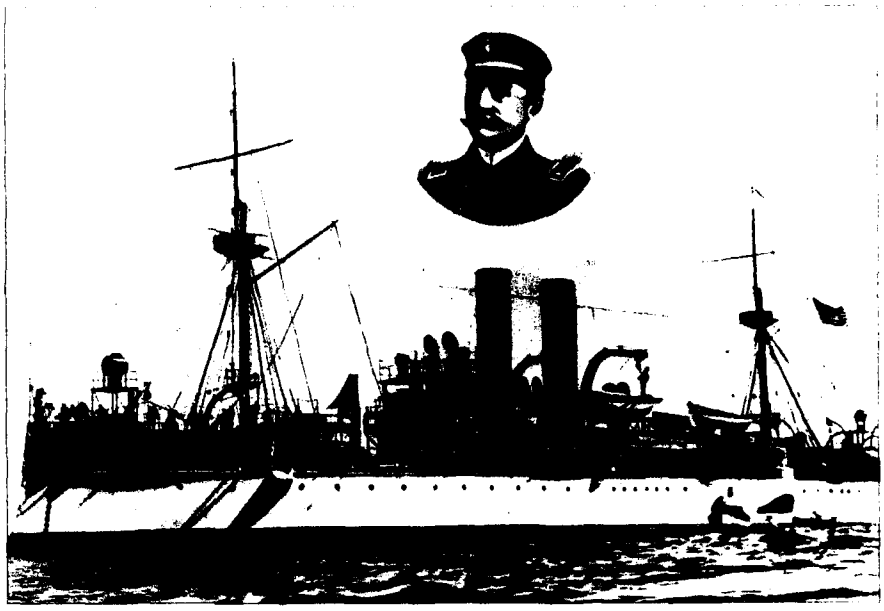
—Benjamin Franklin Tracy

"This country needs a navy that will exempt it from war but the only navy that will accomplish this is a navy that can wage war," Tracy wrote in 1889.[19] "The world needs no assurance of the peaceful purposes of the United States, but we shall probably be in the future more largely a competitor in the commerce of the world, and it is essential to the dignity of this nation...that its navy should be adequate...," his President Benjamin Harrison added.[20]

In 1889, Tracy ranked America's fleet 12th in the world. The 42 ships consisted of three armored cruisers, eight smaller armored warships and 31 unarmored ships built or being built. By comparison, world leader Britain had 367, including 76 armored. He proposed a program of battleships, cruisers and coastal defense vessels

Benjamin Franklin Tracy, SECNAV, 1889-1893.

for a two-ocean fleet, saying, "Naval wars of the future will be short and sharp. It is morally certain that they will be fought out to the end with the force available at the beginning."[20] He did not trust Navy yards and cut expenditures by discontinuing repair work on obsolete vessels. He promoted positive relations with the steelmakers and saw mutual benefit from cooperation, but his impasse with steelmaker Andrew Carnegie over the Navy's rigorous testing methods slowed armor production and ship completion.



The armored cruiser USS Maine, with an inset portrait of her commanding officer, Captain C. D. Sigsbee, ca. 1898.

Proper naval thinking was shifting from a defensive to an offensive role and Congress began favoring larger ships. In 1892, it funded the two mightiest warships ever built in America, for the first time setting no fuel limit or range. Thus, Congress tacitly accepted the offensive doctrine Commodore Stephen Bleeker Luce and Captain Alfred Thayer Mahan had developed, as embodied in Tracy's policy of stopping the enemy at sea before he reaches our shores.

Some bureau operations actually improved. When leaving as Chief of Ordnance in the late 1880s, Captain Montgomery Sicard was congratulated: "The Department is at present in a position to proceed with confidence and energy with the rapid and efficient armament of modern war vessels."[22]

—Hilary Abner Herbert

By his congressional experience, Herbert was the most professionally qualified Secretary and left a positive imprint on naval shipbuilding and policy through his ability to work with both political parties. His committee chairmanship came "at a momentous time in the history of the fleet."[23] When he joined the committee in 1886, the U.S. fleet ranked 19th. When all the ships authorized during his tenure were completed, the Nation ranked 7th.

Few advances occurred in the first half of Herbert's term as SECNAV: "Old problems persisted while new ones arose to tax the ingenuity of the administrators."[24] But, in 1894, he charged the Chief of Construction and Repair with responsibility for ship design, structural strength and stability — its success or failure. As Tracy's ships arrived in late 1893, he found little planning for service facilities (no drydock could accommodate the new battleships) and immediately asked Congress for more yards and fueling stations, particularly on the Pacific coast.

The "smipes" - firemen and coal passers of the USS Maine, in the underwater torpedo room.

The Rise in Expenditures For the New Navy

Fiscal year	Total federal expenditures	Naval expenditures	Percent of total
1890	$318,040,711	$22,006,206	6.9
1900	520,860,847	55,953,078	10.7
1901	524,616,925	60,506,978	11.5
1905	567,278,914	11,550,308	20.7

Source: Potter, *Sea Power: A Naval History*

A depression caused Cleveland to cancel battleship construction until 1895, when foreign events and the need to revitalize the economy prompted resumption. The Navy could not police its hemisphere areas of concern, including Cuba, near armed revolt against Spain, and the Far East.

Herbert's 1895 construction program cost an estimated $12,455 million, or $2,343 million more than appropriated. Innovative ordnance specifications placed the secondary guns on the center line superimposed over the main turrets, and ran electric power to recast, oval turrets. *Maine* and *Texas* began their shakedown cruises, and *Olympia* was commissioned. Three of his battleships, *Kearsarge*, *Kentucky* and *Illinois*, were being built at Newport News Shipbuilding and Drydock Company, scheduled for a 1895 delivery. By 1897, the fleet totaled 111 serviceable vessels of all types.

—John Davis Long

Long was well received by the bureaus and delegated responsibility to his naval subordinates, but his policy moved away from Tracy and Herbert. President William McKinley and Long felt the Navy had grown enough since 1890. Besides, Herbert had assured them they were ready for any war with Spain, which came in 1898.

Long created the Naval Board of 1898 to assist him in making military and technical decisions during the war. This board of senior officers was the forerunner of the permanent General Board he established in 1900, with Admiral George Dewey as president, and ultimately the Office of the Chief of Naval Operations. The General Board would meld operational requirements with ship design.

"There is not an industry in the land which fails to receive direct or indirect profit from the enlargement of the navy," Long said. "Even the cornstalks which the farmer supplies to the manufacturer are used in the making of...armor of warships. More than a hundred trades assist in the building of a man-of-war."[25]

Congress, the Secretary and Contractor Specifications - 1887

As reported in the 1887 SECNAV annual report, in 1886 Congress "put to the test" the ability of the Navy and American shipbuilders to construct cruisers "having the highest standards" providing the following:

"The contracts for the construction of said cruisers shall contain provisions to the effect that the contractor guaranties [*sic*] that when completed and tested for speed, under conditions to be prescribed... the vessel shall exhibit a maximum speed of at least nineteen knots...," further allowed premiums for increases in speed, but required "for every quarter knot that said vessel fails of reaching said guaranteed speed there shall be deducted from the contract price the sum of fifty thousand dollars."

The report further stated, "American shipbuilders have in these contracts placed themselves in line with the foremost in the world." Bids opened on 8 August 1887 for construction of cruisers authorized in 1885 and 1887 and included separate bids depending upon whether hull and machinery would be built to government or bidder's plans and specifications. For example, for cruiser No. 4, Union Iron Works' bid of $1.428M would use government only. William Cramp & Sons of Philadelphia bid $1.410M for using the government's, and $1.325 for using his own.

For machinery, the contractor was required to provide 10 HP for each ton of machinery. "The amount of his compensation being dependent upon the merit of the plans, the contractor is pecuniarily interested in improving the plans. He is made a partner with the Government to raise the character of the ship. The Department therefore opens the door to private enterprise...by allowing more than one form of bidding....Permits any ship-builder who thinks they [plans] can be improved to suggest alternative plans for accomplishing the same result, becoming himself responsible pecuniarily for their success. The system necessarily avoids the ruts common with Government work, for as the art changes and improves, the Government, by constantly holding out premiums for improved results, is the first to secure them."

Congress directed President Cleveland to select a cruiser to be built on the West Coast unless conditions warranted otherwise. He selected Union Iron Works to build one of the ships even though its bid was $18,000 more than Cramp's.

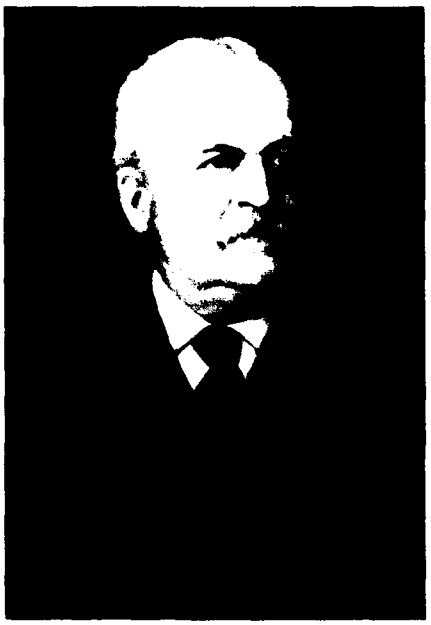
Source: *Annual Report of the Secretary of the Navy, 1887*

Compound Engines and Nickel Steel: The Shipbuilding Industry Responds

The days of old fashioned ships have passed away. The pot-metal guns of 25 years ago will be melted up and a new system of ordnance will rule the hour. New kinds of ships, new kinds of guns, including machine and rapid-firing guns and torpedoes, will take the place of old means of offense and defense.[26]

—Admiral Porter, 1888

Ships were easier to build than were naval policy or the characteristics to go into them. Most naval architects felt a ship's mission should determine its characteristics, but at the beginning of the battleship era (1886) the Navy was not organized to handle it. American steel ship construction was deterred at first by lack of a capability and inexperience in design (blueprints



John Davis Long, SECNAV, 1897-1902.

for early ships were bought from Britain, and armor, shafting and heavy gun mounts were imported). Technology constrained design, and to increase a quality such as guns, armor or speed another had to be traded off. Speed became paramount by 1900.

Beginning in 1885, Congress annually authorized funds for ship construction, and the shore establishment grew to meet the fleet's needs. Before 1900, U.S. designers limited themselves to state-of-the-art technology and produced obsolete ships. "To have done otherwise, they would have had to revive the Old Navy practice of wait and see or foretell the future."[27] Shipbuilding contracts were among the choicest the government awarded, and charges of corruption were hurled about. West Coast yards built ships headed for western home ports.

In 1885, few U.S. warships had compound engines and fewer had steel rifled guns. Before *Chicago* was launched that year, naval armament was antiquated muzzle loader smoothbore Parrott or Dahlgrens converted to rifles by tubes inserted in barrels. The Navy had no funds for testing the modern ordnance inventions. Tracy demanded armament superior to foreign navies' and pointed to U.S. improvements in breech mechanisms, armor-piercing projectiles and larger fixed ammunition. He turned out 214 guns (compared to 46 in the two previous eight years), many at the Naval Gun Factory, established in 1886 in Washington. The Dupont and California Powder companies manufactured improved smokeless powder.

Whitney propped up U.S. steel concerns by combining steel orders for multiple ships and made the common health of the Navy and the steel industry an issue, thus assuring the Navy of both steel supply and political ally. In 1886, he advertised for bids among domestic steelmakers for the Navy's needs, allowing the supplier 30 months to deliver. Employment in the iron and steel industries grew from 141,000 in 1880 to 226,000 in 1900, in no small part due to naval construction.

The 1886 naval act required shipbuilders to use only materials of "domestic manufacture." But Carnegie and others took years to complete the needed manufacturing facilities. The Harvey steel alloy plate process, invented in 1890, soon replaced compound steel in armor plate manufacture and made it doubly resistant to projectiles. In December 1891, the Carnegie-Phipps Company successfully produced nickel steel, and the nationalistic Tracy introduced the concept of a balanced battle fleet deterrent, nickel steel armor, and "a full appreciation of professionalism."[28]

"The inexperience of the Department in its first attempt at the creation of modern vessels of war," Whitney said, "had been such as to excite the greatest concern and disappointment."[29] He also preferred private to public yards because they paid better and were competitive, and felt his biggest contribution was in developing facilities for the modern Navy as a completely domestic product.

USS Indiana *(BB-1) forward port side 8"/35 gun turret, late 1890s.*

The government constructed more drydocks, raising the total of 11 in 1897, only three for battleships, to 21 built or under construction in 1903, eight for battleships. By then, the New York naval shipyard could build battleships and Marc Island, Calif., and Portsmouth, N.H., were ready. By 1900, all ordnance could be made in America. Development of armor, fire control, torpedoes, projectiles and advances in electrical engineering meant newer and larger ships with improved communications.

Congress in 1900 directed SECNAV "to procure by con-

tract armor of the best quality for any and all vessels above referred to...at a price which in his judgment is reasonable and equitable...,"[30] and forbade beginning battleship design work until hull armor could be obtained at $300 a ton or less. If he could not, Congress gave him funds to build the Navy's own armor factory. Construction and Repair disallowed detailed design work until bids could be advertised, which meant work was suspended until the Navy could coerce terms on the steelmakers, but did not have full ship design responsibility until 1894. Work went slowly on the first ships of a class, and two or more generations were designed before the first provided adequate operational feedback. By 1905, the Navy was building all-big-gun battleships with oil-fired turbine engines, rendering the coal-burning reciprocating engines of the 1880-90s obsolete. A program for another newer Navy was about to begin.

Mahan and the Influence of Sea Power

Unless the country - and Congress - are prepared for practically unlimited expenditure, bigger ships mean fewer ships.[31]

—Captain Mahan, ca. 1900

Mahan's naval philosophy and book, *The Influence of Sea Power upon History*, 1670-1783, published in 1890, helped revolutionize the Navy and national strategic thought. A member of the Naval War College faculty, and later its president, he strongly influenced naval policies and programs and is given much of the credit for the Navy's rebirth and the Nation's expansionist tendencies.

Mahan believed navies had an enormous affect on the destiny of nations in quests for power and prosperity and stressed that wealth was gained by sea commerce, must be maintained through the free flow of materials to its ports, and that adversaries must be denied the same. Mahan became "the intellectual voice of the 'New Navy,'"[32] but both Mahan and Tracy may have jumped aboard a bandwagon that had been rolling for 10 years.

Others also were effective in promoting the Navy's modernization. Porter was a beacon. Senator Eugene Hale (R-Maine) was the Senate's influential naval expansionist, and Herbert's Republican House counterpart was Charles Boutelle (Maine). Luce used the Naval War College platform for reform. Lieutenant William S. Sims and Fiske championed improvements in naval gunnery and ordnance. And, there was Theodore Roosevelt, McKinley's Assistant Secretary until the war. Ironically, his book on the naval War of 1812 influenced Mahan, whose subsequent work influenced Roosevelt.

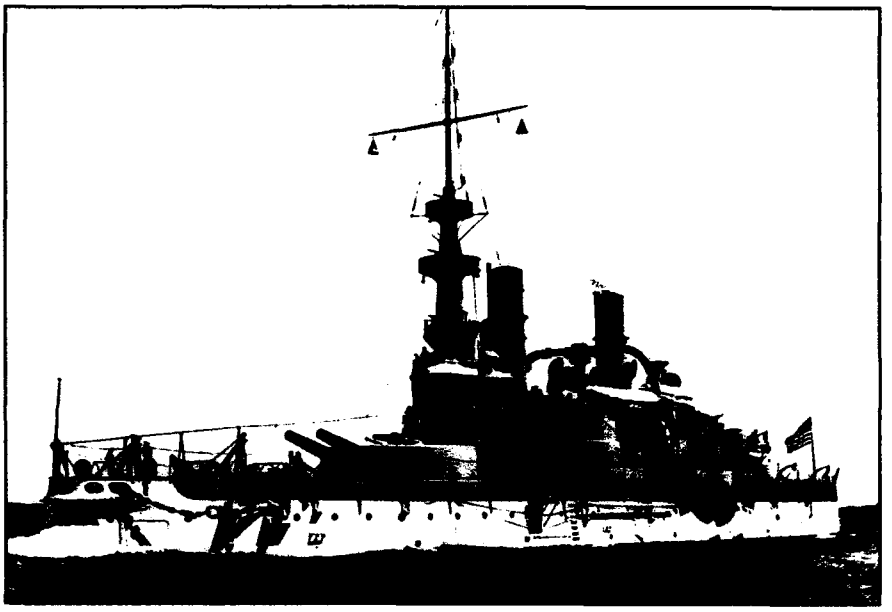
The *Maine* and the "Splendid Little War"

The U.S. naval forces participating at Manila Bay were born of the New Navy, and well they demonstrated their birthright.[33]

—Secretary Long, 1903

War with Spain in the spring of 1898 over Cuba was imminent. To prepare, Congress authorized Long to purchase or charter from domestic lines 11 merchantmen between 4-15,000 tons, borrow revenue cutters, and commandeer numerous tenders and yachts, 128 vessels in all, for $18 million. He also acquired auxiliaries and gunboats, torpedo boats and monitors for coastal defense.

The *Maine*, anchored in Havana harbor, blew up on 15 February 1898, with 266 losses of life.[34] Most Americans immediately blamed the Spanish and demanded retaliation, even though investigators found no evidence of their involvement. But the country went to war anyway.

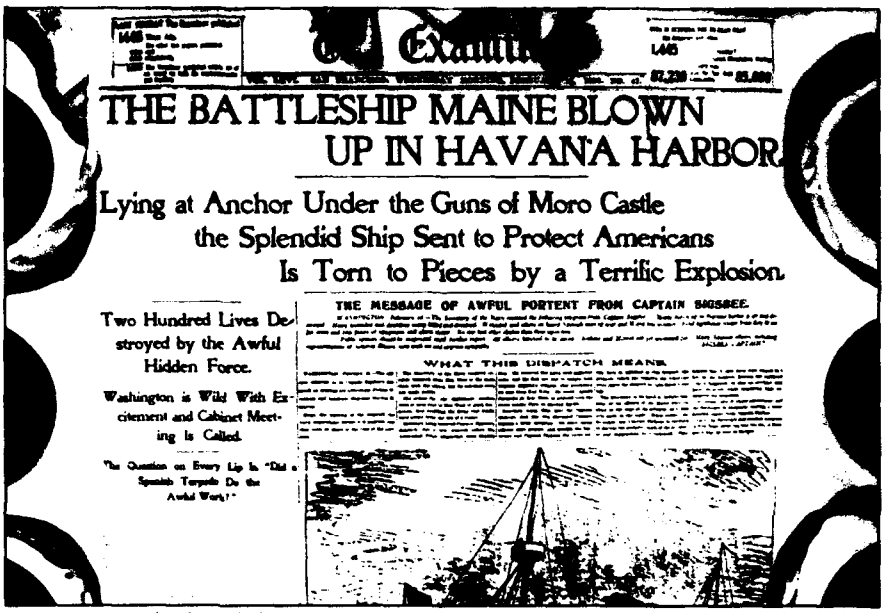


The first battleship of the New Navy, USS Indiana *(BB-1). (Photo courtesy Naval Historical Foundation)*

The naval campaign goal was to defeat the Spanish squadron in the Philippines and control the Atlantic. At Manila Bay on 1 May, the cruiser squadron of Commodore George Dewey, on board *Olympia*, quickly crushed the Spanish at barely any cost, and Dewey became an instant hero. The victory was remote from the primary war zone, the Caribbean, but it generated great public confidence in the Navy. At Santiago, Cuba,

the force of Commodore Winfield Scott Schley, on the flagship cruiser *Brooklyn*, blockaded the Spanish into fighting, with similar results. The New Navy, tested under fire, had arrived.

The two naval victories were the most complete the country has known before or since. The enemy's poor readiness and fighting quality was matched by the inaccurate shooting of American guns, when only three percent of shells hit their targets. However, the ships proved competent. In 100 days of war, the U.S. Navy rose to sixth in the world. "Despite its shortcoming, American naval operations vindicated Mahan's theories as applied to Tracy's policy revolution of 1890."[35] Truly it was just a "splendid little war."


THE BATTLESHIP MAINE BLOWN UP IN HAVANA HARBOR

Lying at Anchor Under the Guns of Moro Castle the Splendid Ship Sent to Protect Americans Is Torn to Pieces by a Terrific Explosion.

Two Hundred Lives Destroyed by the Awful Hidden Force.

Washington is Wild With Excitement and Cabinet Meeting Is Called.

"The Question on Every Lip Is "Did a Spanish Torpedo Do the Awful Work?"

THE MESSAGE OF AWFUL PORTENT FROM CAPTAIN SIGSBEE.

WHAT THIS DISPATCH MEANS.

Navy Museum display of The San Francisco Examiner front page announcing USS Maine disaster, which presaged the Spanish-American War. (Photo by author)

The Cruise of the Great White Fleet

> *First and foremost an exercise of a naval war plan, it evolved into a tool of domestic public relations: it would popularize the navy.*[36]
>
> **—About the cruise**

By early 1907, relations between America and Japan were at a crisis, primarily from discriminatory practices over the flow of immigrants. In response, President Theodore Roosevelt ordered several measures including deployment of the entire battleship fleet to the Pacific. Aside from its historic nature, the cruise was but an interlude in the Far East from America's traditional Eastern focus.

As the entire U.S. fleet of 16 battleships assembled at Hampton Roads, Va., for Roosevelt's review prior to departure on 16 December 1907, [illegible] exclaimed to Secretary Victor H. Metcalf: "Did you ever see such a fleet? Isn't it magnificent? Oughtn't we all feel proud?"[37] Soon the ships steamed out of the Roads for a storied, 14-month around-the-world trip known as the cruise of the Great White Fleet.*


Battle of Cavite, Manila Bay, Philippines, 1 May 1898. Dewey, on flagship USS Olympia leading the U. S. Asiatic Squadron against the Spanish fleet, uttered the immortal words to Olympia's commander, "You may fire when you are ready, Gridley."

The public scrutinized the Navy during most of the trip, directing often acrimonious attention to naval organization and ship design advocated by reformers, but the cruise never really tested deficiencies. In fact, "the cruise tended to mask the navy's defects and thus, at least superficially, to diminish the strength of the reform argument."[38] Proceeding via South America, San Francisco, Hawaii, New Zealand and Australia to Japan, and returning through the Suez Canal and the Mediterranean, the fleet arrived back at Hampton Roads on 22 February 1909. The day dawned under overcast skies and squalls, as Roosevelt headed a throng of tens of thousands of well-wishers, reviewed the entourage, and visited each flagship to meet with the crews.

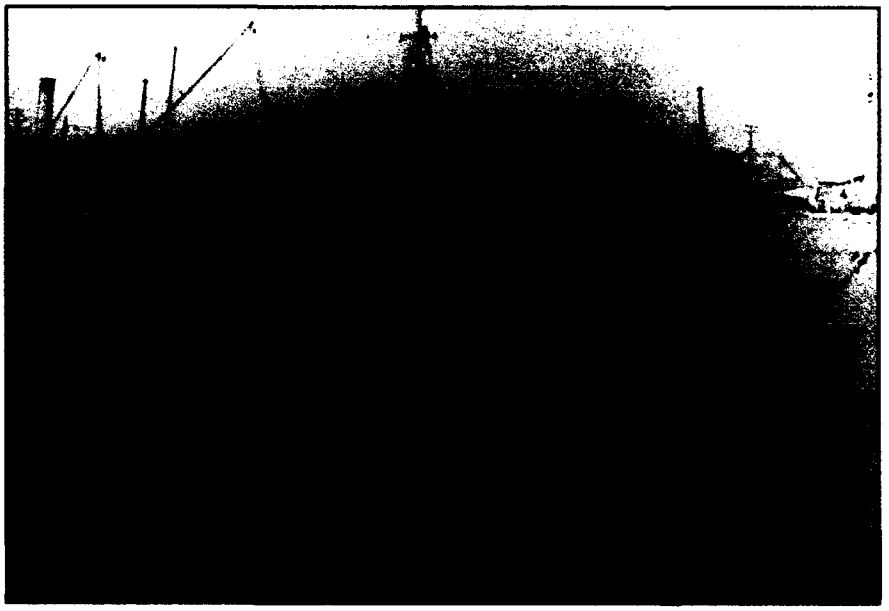
* In the peacetime mode of the day, the Navy painted ship hulls white and all structures above the main deck buff, colors the *Olympia* still [illegible]s.

Builder John P. Holland in the conning tower of USS Holland *(SS-1), the first U.S. submarine.*

After the arrival ceremony was over, a few of the oldest units entered reserve status. The rest went to shipyards for installation of new lattice masts and removal of layers of white paint and the ornate gilded scrollwork from their bows, and fresh new coats of more warlike "battleship grey." "These measures," an observer wrote, "which permanently altered the appearance of the fleet, symbolized not just the end of the cruise and the Great White Fleet, but also the end of an era in American naval development."[39]

Epilogue

The cruise had minimal impact on world events. Instead, the naval arms race of the century's first decade was triggered by European industrialization, the 1906 appearance of the British super battleship HMS *Dreadnought* and the collapse of the Second Hague Conference in 1907. However, the Great White Fleet tested America's new sea legs and "the combined effect of cruise and debate was to set the American Navy firmly on the road toward more rational, efficient, and professional development,"[40] as the seeds of the World War were being sown. Now, after 28 years and victorious at war, the United States for certain had its New Navy.



In drydock at Mare Island, California, are cruiser USS Marblehead *(C-11) and torpedo boats USS* Davis *(TB-12) and USS* Fox *(TB-13), ca. 1900.*

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Endnotes

1. Porter quoted in Herrick, 25.
2. Bennett, 254.
3. Herrick, 23.
4. *Ibid*, 24.
5. Arthur quoted in Long, 15.
6. Hooper, 85-86.
7. Long, 31.
8. Friedman, 20.
9. Herbert quoted in Hammett, 109.
10. Fiske quoted in Hunt, 219-20.
11. Quoted in Musicant, 26.
12. Bennett, 258-59.
13. Chicago *Tribune*, New York *World* and *Leslie's Weekly*, quoted in Hirsch, 258, 262-63.
14. Herrick, 30.
15. *Ibid*, 30.
16. *Ibid*, 33.
17. *Ibid*, 36-37.
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19. Tracy quoted in Potter, 160.
20. Herrick, 142.
21. Tracy quoted in Potter, 56.
22. Quoted in Van Auken, 7.
23. Hammett, 115.
24. Herrick, 160.
25. Long, 56.
26. Porter quoted in Musicant, 12.
27. Musicant, 214.
28. O'Toole, x.
29. Whitney quoted in Hirsch, 297.
30. Long, 51.
31. Mahan quoted in Herrick, 431.
32. O'Toole, 92.
33. Long, 167.
34. On Memorial Day 1915, the mainmast of the *Maine* was dedicated as a memorial at Arlington National Cemetery where the remains of most of her men are buried. Her foremast is at the U.S. Naval Academy.
35. Herrick, 247.
36. Reckner, 13.
37. *Ibid*, 23.
38. *Ibid*, xi.
39. *Ibid*, 156.
40. *Ibid*, 164.

USS Olympia *(C-6)*

Olympia's story is the story of America's military and political maturity. Built under a program to modernize the Navy, the cruiser was one of the first U. S. steel ships. From her launching on 5 November 1892, until her retirement on 1 September 1922, no vessel served the Nation with more honor and distinction. Few participated in as many world events. As Commodore George Dewey's flagship at the Battle of Manila Bay, it is famous for one of the most memorable quotes in U. S. combat history, from Dewey to the ship's commanding officer, "You may fire when you are ready, Gridley." As the sole survivor of the Spanish-American War fleets and of the New Navy of the 1880s-90s, she is a proud symbol of a time when America grew up.

Named for capital of State of Washington. Protected cruiser. Built by Union Iron Works, San Francisco, Calif.
Displacement - 5,870 tons
Length - 344 feet
Beam - 53 feet Mean draft - 21.5 feet
Maximum speed - 23 knots
Twin screws - 3 cylinder triple expansion engines, 18,000 HP 6 scotch (firetube) boilers
Complement - 34 officers and 440 men, including Marine guard
Armament - Guns: four 8-inch, ten 5-inch, fourteen 6-pounders, six 1-pounders, and six 18-inch torpedo tubes

Source: Pamphlet, Cruiser Olympia Association, Inc., Philadelphia, Pa.

Stern view of USS Olympia *as she is today, moored at Penns Landing, Philadelphia. (Photo by author)*

BOOK REVIEW

THE U.S. ARMY IN TRANSITION II

Landpower in the Information Age

by Lt.Gen. Frederic J. Brown, USA (Ret.) Brassey's (US), McLean, Va., 1993, pp 205, ISBN 0-02-881034-1

This book attempts to "probe the design of a new army from the foundation up..." necessitated by the meltdown of the current defense structure and the incorporation of high-technology systems and communications on the battlefield. General Brown develops his admittedly "cloudy vision" of the new Army by analyzing the potential effects of technology on the conduct of training, utilization and organization of the Army Reserve and National Guard, reconstitution, leader development, and force deployment.

He is most effective in areas in which he obviously has had firsthand experience, such as training. His concept for harnessing the emerging power of the computer to provide distributed, visual simulation ("virtual reality") over a telecommunications net, especially for the reserves, has the gritty feel of someone who has spent many weekend hours and endured the frustrations of accomplishing reserve forces training. He correctly emphasizes that high-quality personnel at all levels (noncommissioned officer through senior commander) is a necessary condition to exploit the capabilities of high technology, "information age" equipment on the battlefield where each leadership level will increasingly require management and computer skills that blur the traditional doer (NCO - blue collar) and manager (officer - white collar) divisions of responsibility. His description of reconstitution, and the tradeoffs which will eventually be faced in terms of cohesion (based on units deploying) vs. capability (specific battlefield operating systems, such as air defense or military intelligence systems deploying) is nuanced and intellectually provocative and reflective of his years at the senior command levels.

The general is unconvincing, though, when he resorts to yuppie-like managerial babble about: (1) "gold collar" skills for senior commanders — the ability to accomplish innovative tasks, exploit existing capabilities in new ways, etc. (Isn't that what they've always done, or supposed to have done?); "hypercommunications" — global communications technology (Remember "instant communications?); and (3) Third Wave War — a yuppyism borrowed from the Tofflers describing a postindustrial war model supposedly demonstrated by Operation Desert Storm. The discussion of shaping units by race or ethnicity for a particular operation borders on the fantastic. (Think of a specially constituted brigade-size force of African-Americans being sent to Somalia. Would the congressional Black Caucus have fun with that one or what?) Other minor irritants are several references to the United States as an island continent (Australia?) and an example of an information age communications system as the Multiple Subscriber Equipment (Mobile Subscriber Equipment).

General Brown's avowed purpose in writing this book was to put the issues of the information age affecting the U.S. Army "on the table" and provide a framework for debate. In this he has succeeded; the debate is joined.

Gary J. Hagan, Acquisition Policy Department, Defense Systems Management College.

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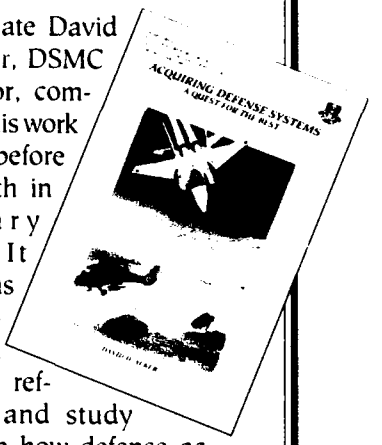
DSMC Press Technical Report, TR 1-93

ACQUIRING DEFENSE SYSTEMS:

A Quest for the Best

David D. Acker



The late David D. Acker, DSMC Professor, completed this work shortly before his death in January 1992. It serves as an excellent, detailed reference and study piece on how defense acquisition has been conducted since World War II. Researchers will find it of value in tracking much of the organization, policies, structure, top management personnel and hot topics of defense acquisition into 1989.

This work, published in September, is the first of a new series of DSMC Technical Reports. Copies are contained in the DSMC library and selected principal DOD and regional university libraries. Limited copies are available (one per customer) by written request to: DEFENSE SYST MGMT COLG, ATTN: OSPR, 9820 BELVOIR RD, SUITE G38, FT BELVOIR VA 22060-5565. It is available to nongovernment personnel from Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402, Stock #008-020-01315-3, for $28.00.

COST-PLUS-PERCENTAGE-OF-COST CONTRACTS:

Are We Still Writing Them?

Paul Stein
Dr. Eileen Donnelly

You know about the prohibition against Cost-Plus-Percentage-of-Cost Contracts, don't you? But, do you know that stated percentages are not required?

The National Defense Act of July 2, 1940, in discussing appropriate methods of government contracting states in part "...provided further that the cost-plus-percentage-of-cost system of contracting shall not be used...."[1] This language has been incorporated into 41 USC @ 254 (b).

The key word, "system," has generally been omitted from citations, thereby providing many contracting officers with an incomplete view of the prohibition.

It is well known that cost-plus-percentage-of-cost (CPPC) contracts are prohibited by 10 USC @ 2306 (a). This is a form of contracting which reimburses the contractor for costs incurred, plus a percentage of the cost incurred for profit. What is not widely known is that CPPC contracting is only one type of a prohibited form of contracting. It is actually the cost-plus-percentage-of-cost system of contracting that is prohibited by law. The prohibition of cost-plus-percentage-of-cost contracts has been widely cited over the years. However, the word "system" has been omitted in many references. The result is that many are not aware that the prohibition is against a system of contracting, a broad term, rather than against one type of contract. Unfortunately, the narrow construction is the more familiar interpretation.

This article is written to alert contracting personnel to this commonly misunderstood and prohibited system of contracting.

Muschany Decision

The criteria for this form of contracting was provided by the U.S. Supreme Court. In *Muschany v. U.S.*, which is the seminal case in the area, the U.S. Supreme Court defined a cost-plus-percentage-of-cost system of contracting as one in which "the Government contracts and is bound to pay costs undetermined at the time the contract is made and to be incurred in the future, plus a commission based on a percentage of these future costs."[2] It is "a system of contracting which Congress forbade, a system which from its very nature keeps constantly dangling before the eyes of the government's contractual agent hope of a progressingly (sic) increasing reward for himself for every added dollar of costs he can get the government to pay. This system of contracting was not deemed vicious for lack of certainty as to costs, but because of the certainty of its inexorable tendency to elevate those costs to heights which would impose unfair burdens on the public treasury."[3]

The definition of a CPPC system of contracting has been widely and incorrectly interpreted by legal commentators to require the presence of four essential elements before the CPPC contract can be found. Although, this definition contains the correct

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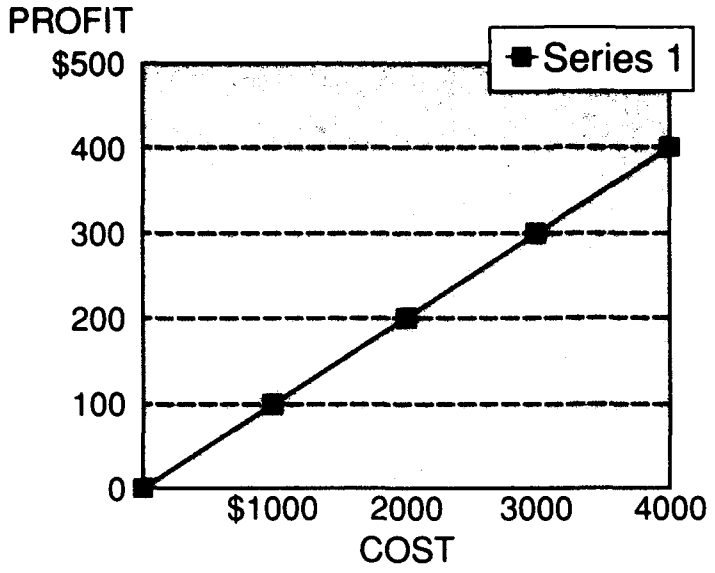
Dr. Donnelly, J.D., is a Professor of Government Contract Law at AFIT, and Course Director of the newly developed curriculum on Alternate Dispute Resolutions.

FIGURE 1. CPPC



criteria for identifying a CPPC contract, it is an incomplete definition as it fails to include additional criteria for identifying contracts in violation of the CPPC system of contracting.

The widely known, four-point test is based on a commonly cited GAO decision involving Marketing Consultants International Limited.[4] In this case, GAO ruled that a contract containing the four points was a CPPC contract. Unfortunately, there is widespread belief that only contracts containing those four points could be in violation of the CPPC system of contracting. This is incorrect.

Four-Point Test

The four-point test cited by GAO can identify a single type of the prohibited form of contracting — the CPPC contract. It does not identify other forms of contract types that fall within the CPPC system of contracting.

The four-point test cited by GAO to determine CPPC contracts is as follows:

—Payment for profit is based on a predetermined percentage rate
—The predetermined percentage rate is applied to actual performance costs
—Contractor entitlement is uncertain at the time of contracting
—Contractor entitlement increases commensurately with increased performance costs.[5]

As stated, contracts meeting all four criteria violate the prohibition against CPPC contracts. However, other contract forms not meeting the four-point test also may violate the CPPC system of contracting.

A contract provision need not state a profit percentage for the contract to be classified as CPPC, nor is it necessary for profit to increase uniformly throughout contract performance.

The most common misconception is that the prohibited form of contracting can exist only when a fixed profit percentage is stated in the contract, and this percentage is to be applied to each increasing dollar of contract costs. Given this erroneous belief, contracting personnel often structure contracts that provide profit ranges, which increase in a stepwise relationship to increased costs. Therefore, profit dollars are fixed to a maximum cost point, and increase by additional fixed amounts as cost points increase. Contracting personnel generally believe using fixed profit dollars, rather than a fixed profit percentage, and increasing profit in a stepwise, rather than linear relationship, avoids the illegal system of contracting.

Figure 1 illustrates the more commonly known CPPC contract. As the figure shows, for every increased dollar of cost, profit increases by a fixed percentage. For example, at $1,000 of cost, profit is $100, or 10 percent of cost; at $3,000 of cost, profit is $300, or 10 percent. For each additional dollar of cost, profit increases by 10 percent.

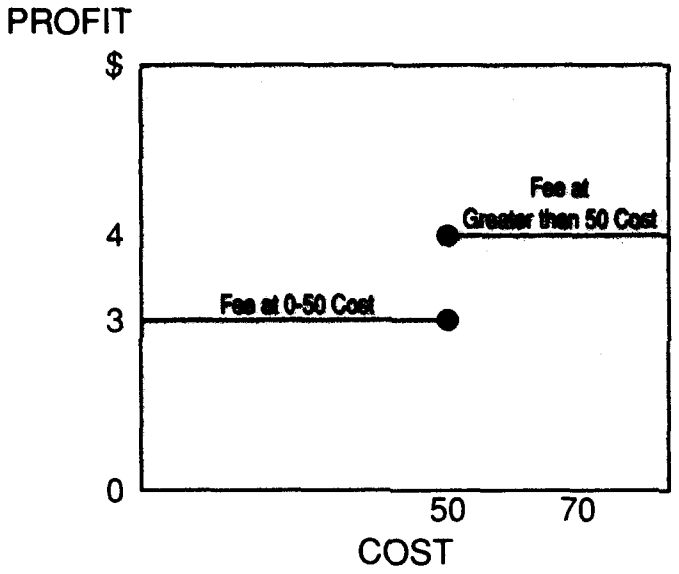
Figure 2 illustrates the less commonly known form of the prohibited CPPC system of contracting. In Figure 2, at the cost points $0-50, the fee is $3. If the cost point exceeds $50, the fee increases to $4. Therefore, contractors are incentivized (rewarded through increased profit) to exceed $50 of cost. Contracts are commonly constructed using fee-to-cost relationships identical, or similar, to Figure 2. This form of construction violates the prohibition against the CPPC system of contracting.

Prior Decisions

A review of decisions following the *Muschany* case disclosed that GAO and court decisions have been consistent in interpreting that it is the CPPC system of contracting which is prohibited. Selected cases and key wording from the decisions are presented below.

1. In Marketing Consultants International Limited, the GAO decision made it clear that a contract may be classified as CPPC, when increases in contract costs will eventually generate increases in contractor profit. Profit may increase at different rates than costs increase, and may even show intermittent decreases as costs increase. The GAO stated, "use of sliding matrix for percentage fee de-

FIGURE 2. CPPC System of Contracting



termination that has some points at which fee falls as costs increase does not avoid cost plus a percentage of cost prohibition since overall effect of payment procedure is that fee increases and incentive is to raise costs sufficiently to avoid profit depression." In the Marketing Consultants case, the contract fee provision (see Figure 3) was determined to be CPPC.[6]

Note that in the "Marketing International" case, a "stated, though varying, percentage" was applied to incurred costs.

2. In a State Department case, the Comptroller General decision stated, "Characterizing management fees as 'fixed fees based on different levels of effort' does not prevent (the) contract from being contrary to statute when all elements of cost-plus- percentage-of-cost system of contracting are present....In cost-plus-percentage-of-cost contracting, *the fact that payment* in addition to actual costs is at a predetermined dollar amount, rather than at predetermined percentage rate, is immaterial when contractor fees increase in direct proportion to costs of performance." In this State Department decision, a contract with the following terms and initially labeled a "fixed price technical services contract," was determined to violate the *prohibition against* CPPC *contracting* based on the cost/fee arrangement (see Figure 4).

The Comptroller General stated, "we do not believe that characterizing these as fixed fee contracts...or characterizing the management fee as a fixed fee which varies with level of effort, prevents these contracts as a whole from being contrary to statute. As we have pointed out, what Congress provided against was not a cost-plus-percentage-of-cost contract, but such a system of contracting."[7]

3. A Comptroller General decision sent to the Secretary of Defense stated that developing overhead rates as a fixed percentage of costs also creates a CPPC system of contracting. Some contractors apply standard overhead and general and administrative rates to actual contract costs. For example, a contractor may always apply a 15 *percent G&A rate to contract costs.* The rate is not based on traditional computational techniques, and actual rates are not determined subsequent to contract performance. The GAO determined this method also creates a CPPC system of contracting, since inasmuch as the amount paid as reimbursement for overhead will diminish or increase in proportion to the direct costs incurred rather than the overhead incurred by the contractor. The use of fixed percentages for provisional rates only, was determined to be acceptable."[8]

4. In an Air Force contract with Curtis-Wright Europa, N.V., the decision stated, "A contract ceiling does not prevent a contract from being in violation of the prohibition against the CPPC system of contracting."[9] Early decisions in this area stated that the use of a ceiling prevented a contract from being categorized as a CPPC system of contracting. However, after the *Muschany* decision, the Comptroller General issued guidance that a ceiling is not sufficient to prevent CPPC contracting. In a letter to the Secretary of the Air Force, the Comptroller General stated, "It is true that in a number of our earlier decisions we took the view that absolute cost limitations...would sufficiently protect the U.S. against the evils at which the cost plus percentage prohibition was directed...since B-46232, of March 28, 1945, we have adhered to the rule that such controls or dubious cost limitations are not sufficient to save such contracts from violating the prohibition."

The Path to CPPC Contracting Is Paved with Good Intentions

The GAO and court definitions assume the contractor's ability to control and manipulate the incurrence of performance costs in order to increase the element of payment based on a predetermined percentage rate. The element of payment based on a percentage rate may be commission, fee, *profit and (in some cases) overhead.* Contracting officers who create CPPC contract types are attempting to devise workable solutions to difficult contracting situations. In all cases, the contracting officer's primary concern is to create a pricing structure that will protect the government.

Contracting personnel have devised many creative clauses. Unfortunately,

FIGURE 3. Contract Fee Provision

Dollar Value - $ 0 to ($24,999.99 of invoice)	$25,000.00 to $49,999.99	$50,000.00 to $74,999.99	$75,000.00 and up
(Percentage Fee - 13.5% Reimbursed)	11%	8.5%	6%

some result in creating this prohibited form of contracting. In Urban Data Systems, the Board wrote, "The appellant may have been led down a primrose path, paved with good intentions, to the unhappy end of void *ab initio* contracts....However we must be mindful of the fact that hard cases make bad law....The fact that agents of the Government may have unknowingly misled the appellant into a mistaken belief that such agents had the authority to award the appellant contracts to be priced on a cost-plus-percentage-of-cost basis cannot provide relief to the appellants."[10]

A variation of the CPPC contract was commonly used in some Air Force buying commands. At these commands, contracting officers tried to circumvent the CPPC challenge by identifying contract types as being firm-fixed-priced, pricing these contracts at a ceiling, and then (through a contract clause) reducing contractor profit when incurred costs were lower than originally estimated. Unlike incentive-type contracts, which reward contractors with increased profits as costs are reduced, these clauses result in reduced profits for reduced cost. These clauses, in effect, penalize the contractor by reducing contract costs. The Air Force General Counsel found these contracts to be in violation of the prohibition against CPPC contracting.[11]

Still Writing

We in government are still writing creative clauses that generate the prohibited form of contracting. These clauses are a good-faith attempt to deal with a difficult question in contracting. (Why let a contractor keep a $100,000 fixed fee when that contractor may complete the contract for one-third of the estimated cost. The fee will be excessive.)

Frequently, the solution is to add a clause that links profit to incurred cost. This is done most often by creating clauses which reduce a fixed fee by a percentage of the unexpended cost (as in the Air Force situation cited supra). This quick fix creates a form of the undesirable CPPC contract. To become vulnerable to a challenge of a CPPC contract, there must be a clause that creates a "negative incentive provision" (defined as a provision that encourages contractor cost expenditures) by paying increased contractor profits for increased contractor costs.

The Cure

Contracts determined to be CPPC contracts violate the statutory prohibition and are void *ab initio*. The relief available to the contractor is *quantum meruit/quantum valebant* recovery. In these cases, contracting officers have been instructed to determine the fair value of goods and services received and provide payment on that basis, rather than on the basis of incurred cost. This recovery "is not based on costs nor a reasonable return on investment of the seller, but on reasonable value in the marketplace of the property sold. Reasonable value can include profit in whole or in part. This result is not affected because the clause was originally inserted into the contract at the Government's insistence."

As the court observed in "Urban Data Systems," "one who purports to contract with the United States assumes the risk that the individual with whom he deals is clothed with actual authority to enter the contract alleged." Id., 699 F.2d 11563-4, quoting from, *Haight v. United States*, 209 Ct. Cl. 698, 538 F.2d 346 (1976).[12]

We now know it is the cost-plus-percentage-of-cost system of contracting that is prohibited. As described above, the system can be violated through the use of types of contract construction that reward contractors by linking increased profit dollars to increased contract costs.

Endnotes

1. *Muschany v. U.S.*, 324 U.S. 49, 1945, note 51.
2. Supra at Endnote 1, note 61.
3. Supra at Endnote 1, note 73.
4. Marketing Consultants International limited, B-183705, 75-2, CPD 384.
5. Supra at Endnote 4. p. 11.
6. Supra at Endnote 1. pp. 12, 13.
7. Comptroller General Decision B-196556, 5 August 1980.
8. Comptroller General Decision B-126794, 27 January 1956, Vol. 35, p. 434.
9. Comptroller General Decision B-120546, 21 July 1958, Vol. 38, p. 38.
10. Urban Data Systems, GSBCA No. 5545, 31 July 1981.
11. Office of the General Counsel, 23 March 1984. Reported by Air Force Audit Agency in Audit Report No. 3066416, 18 March 1985.
12. Supra at Endnote 11.

Figure 4. Cost/Fee Arrangement

Monthly Total	Management Fee
$ 0 - 5,000	$ 250
5,001 - 10,000	750
10,001 - 15,000	1,250
15,001 - 20,000	750 plus $500 for each additional $5,000 of invoiced costs

A GENERIC RATIONALE FOR LONG-TERM RESIDENTIAL PROGRAMS

For Managers/Executives in the Federal Government

Dr. Ronald J. Stupak

The foundation for all long-term public sector manager/executive development programs is to take the participants away from familiar work surroundings so they can be free from urgent and immediate pressures and think about the important and longer-range concerns of managing complex systems. Individuals should disconnect psychologically from the anchors of a job in order to be open to new, novel and challenging intellectual experiences.

Cultivate

Reading certain essays, articles, reports and/or books is essential to understanding the concepts, ideas, techniques and management style of the current presidential administration. It is important to cultivate the time, space and trust needed to interact with "strangers" from other departments, agencies and organizations. Research shows "climate-setting" is an essential segment in effective adult learning programs.

Participants need to undertake an intensive competencies assessment under the direction and guidance of professional faculty, trainers and consultants. In effect, taking numerous assessment inventories needs to be analyzed, processed and assimilated carefully and integratively so as not to cause "learning to become a dangerous thing" in the hands of amateurs and/or managers too busy to understand the possibilities of the respective inventories as well as their limitations.

"Second Profession" Credibility

Removed from a routine work schedule, a person can be confronted with the essential requirements, expectations and competencies that demarcate the manager/leadership roles. To understand the obligations of the "second profession" requires an intensive segment of time in order to give it the credence the first profession (i.e., engineer, physicist, etc.) has had in a respective organizational life.

Having "time to practice" in a "laboratory environment" some of the new skills and competencies learned at the executive development center becomes necessary so a comfort index and action level is tested before taking it back to the "real world" of the organizational crucible.

Training into Action

With time available, individuals can update individual career life design/plans under the guidance of professional developers and career-planning counselors, and develop an operational "action plan" to guarantee that training is directly interjected into a workable cost-effective improvement in the organization.

Finally, during this time, participants should symbolically equate their developmental experiences at prestigious development centers with those of the private sector parallel counterparts who attend long-term management programs offered at America's most prestigious universities and training centers.

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ACQUISITION REVIEW QUARTERLY APPROVED

Inaugural Issue Due within Weeks

Dr. John M. Deutch, Under Secretary of Defense (Acquisition), has approved and issued the charter for the *Acquisition Review Quarterly* (*ARQ*), the scholarly refereed journal of the Defense Acquisition University (DAU). The *ARQ* is edited and published for the DAU by the Defense Systems Management College (DSMC) Press. The inaugural issue will be out within the next few weeks.

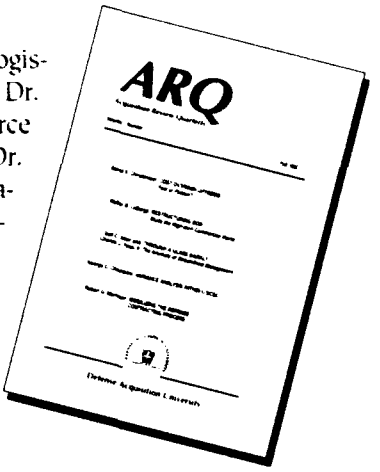
Dr. Deutch cited the Defense Acquisition Workforce Improvement Act (DAWIA), which requires the DAU to include research and publication capabilities to support the workforce, as the basis for the *ARQ*. The journal serves persons in the Acquisition Corps, Congress, industry and academia having significant interests in how the Department of Defense conducts acquisition business.

Mechanism for Scholarly Research and Policy Exchange

"The purpose of the *ARQ*," Dr. Deutch stated, "is to provide a mechanism for fostering and disseminating scholarly research on acquisition issues, and for acquisition policymakers to exchange opinions on issues, communicate policy decisions, and maintain high levels of awareness among acquisition professionals regarding acquisition management philosophies."

Dr. Deutch continued, "The *ARQ* should be developed as a premier publication within government supporting acquisition research and analysis, with acquisition defined in its broadest sense. It also should serve to integrate the professional interests of the various career fields in ther workforce, infusing senior managers with a sense of community and common purpose, and provide the forum for scholarly debate envisioned by the DAWIA. This effort has the encouragement and support of all in the acquisition community."

The *ARQ* Editorial Board consists of representatives from the six largest DAU consortium member schools: Dr. David Lamm, Naval Postgraduate School; Dr. Rita Wells, Industrial College of the Armed Forces; LTC Daniel D. Ziomek, USA, Army Logistics Management College; Dr. Richard Murphy, Air Force Institute of Technology; Dr. Stephen Versace, Information Resources Management College; Wilbur Jones and Robert Ball, DSMC; and Frank Sobieszczyk, DAU. The *ARQ* Review Board is in the process of being named.



Mr. Jones, Director, DSMC Press, serves as managing editor, and Mr. Ball is the editor. Their telephone numbers are 703-805-2525 (DSN 655-2525) and 703-805-2892 (DSN 655-2892), respectively.

Separate Circulation Intended

The first two issues will be mailed automatically to everyone on the *Program Manager* subscription list, to lists of senior members of the Acquisition Corps provided by each Military Service and selected government and university libraries. Ultimately, the *ARQ* will establish its separate circulation list.

Government employees who wish to subscribe to the *ARQ* must submit a written request (return card or letter) to: Editor, *Acquisition Review Quarterly*, Defense Acquisition University, 2001 N. Beauregard St., Alexandria, VA 22311. The *ARQ* is negotiating with the U.S. Government Printing Office for their handling of paid, nongovernment subscriptions.

Manuscripts Solicited

Authors, particularly faculty, staff and students of consortium member schools, and members of the Acquisition Corps are encouraged to submit manuscripts for consideration. Author guidelines are included in the first issue and are available from the editor on request.

INDUSTRIAL DEVELOPMENT

Education in Acquisition (IDEA) Program

Major J. Brian Turk, USAF

Is Big Brother just keeping watch — or really learning? This was the subliminal question that seemed to follow me from one management meeting to another once I entered the newest Air Force Education With Industry (EWI) program known as Industrial Development Education in Acquisition (IDEA).

Lockheed Sanders, Inc. in Nashua, N.H., was my host for a 6-month education-in-acquisition assignment with their Air Force Mission Support System (AFMSS) program office. The Air Force has selected AFMSS as the next-generation mission planning system for all current types of Air Force aircraft, including fighters, bombers, transports, tankers and helicopters.

Actually, Big Brother has been watching *and* learning consistently since 1947, when General Henry H. "Hap" Arnold, known as the "Father of the U.S. Air Force," determined that his Service had made too many acquisition mistakes during World War II.

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Major J. Brian Turk, USAF, at AFMSS (sitting); Amby Nangeroni, Lockheed Sanders, Inc., Program Manager for Systems.

work sheets were received. Most company managers welcomed the visit. They viewed it as an opportunity to pass issues, information on new product development, and concerns directly to the program offices. *Note:* At

and its products in relation to programs supported. These data were then entered into the Space and Missile Industrial Information System (SAMIIS).[2] To ensure recommendations are completed, actions and fol-

a possible detriment to the ability to perform and meet production requirements within the next five years.

High Risk. The ability and/or the desire of the company to continue

In an effort to rectify the situation, he sent several colonels to various industries to work side-by-side with top management and thereby better understand industry. Well-received by corporations and the Air Force, General Arnold's program continues and has evolved over the years to now include civilian, as well as military Air Force acquisition personnel.

The IDEA is the latest evolution. Sponsored by the U.S. Air Force Materiel Command, the program is managed by the new Air Education and Training Command's (AETC) Air Force

In light of our success in Operation Desert Storm and the renewed interest and respect for U.S. military capabilities, the IDEA program can only become more valuable for the "smaller, smarter" Air Force of the future.

Institute of Technology (the graduate university for the Air Force), in cooperation with major defense contractors, including Lockheed Sanders, Inc., General Electric, Hughes Aircraft, GTE Government Systems, and many other companies. Only highly experienced captains, majors, lieutenant colonels, and GS/GM-11s through 14s are selected for the program. Further, these candidates must meet equally high education standards, be fully qualified in one or more functional areas, and specialize in narrowly focused acquisition programs of relative short durations.

Key Processes

What does the IDEA program participant strive to learn? First, the student must try to understand the overall viewpoint of the company, along with its policies and methods of managing human resources, research, engineering, production, quality assurance, marketing and accounting. Then, the participant concentrates on an option area, such as program management. Specifically, the student explores and often discovers the significance of such key processes as the following:

—The commitment of resources a company must make, and the risks involved before a contract award by the government
—The effective use of contractual teaming agreements to clarify roles and responsibilities when two or more companies are involved in a government contract
—The domino effect created by changes or contractually overimposed specifications, which may contribute to delivery delays and cost overruns.

Doing More with Less

I found the IDEA program provides a selected Air Force personnel with an exciting opportunity to witness, closely and personally, the problems and pitfalls encountered and skills and courage required to perform as a defense contractor in an era of declining budgets and downsized planning.

In light of our success in Operation Desert Storm and the renewed interest and respect for U.S. military capabilities, the IDEA program can only become more valuable for the "smaller, smarter" Air Force of the future. As we try to do more with less, it is not just desirable, but imperative that we foster true teamwork among Department of Defense acquisition agencies and our counterparts in industry.

Yes, Big Brother *has* been watching — and learning a lot from a good IDEA.

REENGINEERING COST ANALYSIS:

A Case for Cost Reform

Mark E. Gindele

"This COEA is going nowhere," said the business financial manager (BFM) for a highly visible Naval Air Systems Command program manager, referring to the cost estimates contained in a draft version of a Cost and Operational Effectiveness Analysis (COEA) document.[1] "These numbers support modifying the existing system, not the new development. This isn't right. Let's see where we can adjust the estimate to get back to supporting the new program."

"There's not a lot of room to move on," said the cost analyst, referring to the cost estimate and the ground rules and assumptions used to support the estimates. "We fund you to support the program," said the BFM. "If you produce reports like these, you're going to kill the program. If you kill the program, then you're out of a job. You have to come up with a way to back the new program."

Are these events happening in program offices? Is there a problem with having COEAs and cost estimates paid for by the program office which prefers the document supports the program they are sponsoring? Are defense cost estimates truly independent or are they political statements necessary to keep the programs funded and approved? These questions and their implications on how business is conducted in military acquisition need to be addressed by the current administration as the world moves toward a globally competitive environment.

Mr. Gindele is an Operations Research Analyst for the Naval Air Warfare Center in Warminster, Pa., and supports the Naval Air Systems Command.

Determining and Defining

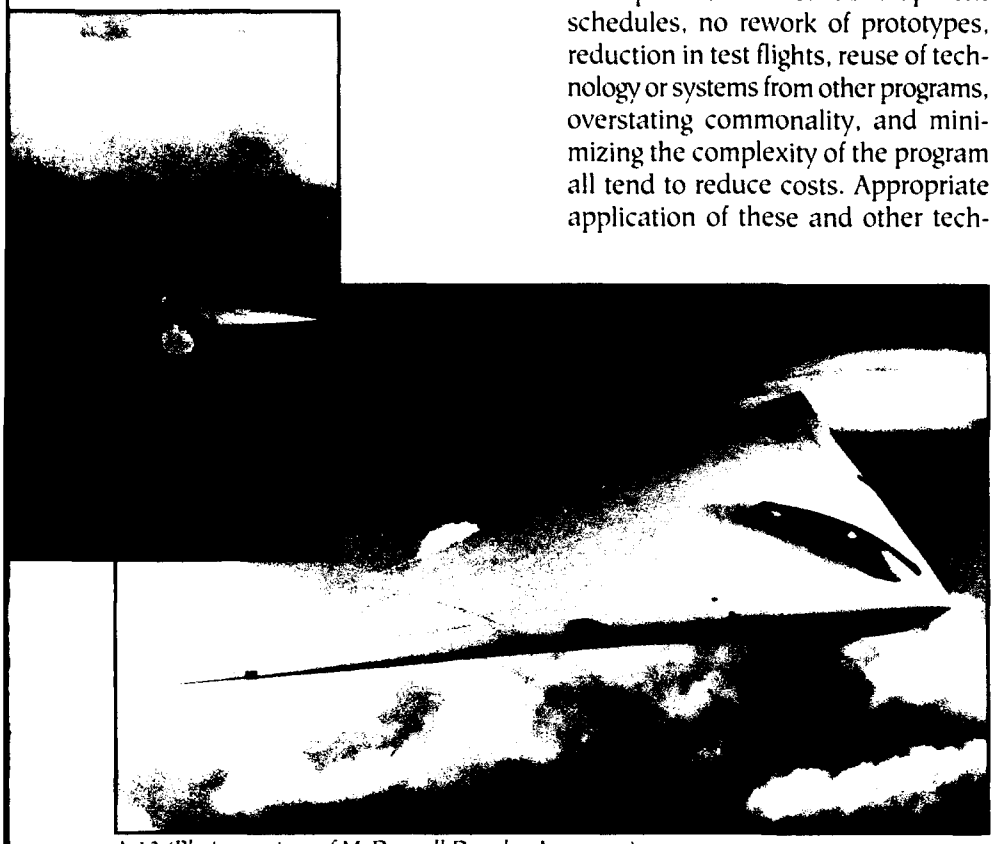
While accountants follow standards established by Generally Accepted Accounting Principles (GAAP), and the Securities and Exchange Commission (SEC) established requirements for audited financial statements certified by independent public accountants, government cost estimators have complete freedom to determine estimates for military programs in many different ways. Estimating techniques often depends on the phase a program is in, such as concept stage, full-scale development (FSD) or production. Oversight of the estimate is often determined by the total dollar value of the estimated program. The more expensive programs are reviewed by more departments.

When a program is in its beginning phases, it is difficult to define. Oftentimes a new program is defined by performance goals rather than specific systems, and these "goals" are difficult to define in terms of cost and schedule. This gives the program office and cost estimators opportunities to define optimistically the program and systems for hardware, software and maintenance elements. Since the program is approved to continue as a program by passing a milestone decision, it behooves the program office to continue developing and supporting cost estimates that support the "approved" program. Issuing a COEA or program summary contrary to the approved budget would, most likely, be equivalent to the "kiss of death" for the program.

F-22 (Photo courtesy of Lockheed)

With the program manager's (PM's) job to keep the program running, iterations are made defining the system in terms usable by cost analysts. When a particular mix of input variables offers a configuration that is technically believable and program-

"Did we really think we could buy the A-12 development program for about 35 percent of the F-22 development effort?"



A-12 (Photo courtesy of McDonnell Douglas Aerospace)

matically acceptable, the cost estimate is solidified. To get to this point, the team defining the cost-feasible concept sometimes omits elements of the program that must be bought sometime during the life cycle of the program, but are not highly visible to reviewers at this phase. For example, on a software intensive weapon system the application software would be estimated, but the less-obvious support software; i.e. simulation, stimulation, test, training and tools would be optimized in terms of cost.

Cost-estimating Techniques

In addition to insufficiently detailing the technical aspects of the program and, therefore, not identifying all the costs, the cost analysts can employ a host of cost-estimating techniques that adjust the cost estimate. Applying learning curves, rate curves[2] and productivity enhancements through automation can greatly affect production cost estimates. In the FSD phase, shorter development schedules, no rework of prototypes, reduction in test flights, reuse of technology or systems from other programs, overstating commonality, and minimizing the complexity of the program all tend to reduce costs. Appropriate application of these and other techniques usually makes possible an estimation of the program within program budget constraints.

As the program progresses through various reviews and milestone decisions, more opportunities present themselves to support political cost estimates, because more documents are generated on the program. Customized work breakdown structures (WBS), contract line item numbers (CLIN), cost breakdown structures (CBS), and various functionality charts can be used to compare selectively the new program to analogous projects. Cost-estimating relationships (CERs) can be developed using selective or limited data to support the cost reasonableness of the new program. Cost estimates can then be "backed into" to support the program rather than independently developed to determine the budget and address affordability issues.

This expansion of estimating techniques continues into the request for proposal (RFP) and contracting cycle. Cost instructions to offerors are detailed, requiring offerors to trace cost estimates to CLINs, WBS and functional categories using numerous trees, charts and diagrams. Multiple requests are made for detailed documentation of the contractor's estimating system and traceability of cost estimates to contractor's historical cost.[3] Often, the cost instructions, which are prepared independently of the technical instructions and without sensitivity to the contractor's accounting system, rival the technical request for information in page count. The results often are less than desired, necessitating a cost-realism study.

Cost Analysis Issues

Cost realism, as defined in Defense Supplement to the Federal Acquisition Regulations 215.805-70, permits the government to evaluate cost estimates, "...to ensure that proposed costs are consistent with the technical proposal...." This allows the government to adjust individual contractor cost estimates, based on government understanding of the contractor technical proposal, and evaluate the proposal based on the adjusted estimate. It is possible, therefore, on an evaluation where all other elements are equal, to select a contractor whose perceived cost by the government is less than all others. This makes cost analysis critical when evaluating successful contractors.

Cost analysis could be used also in the post-contract award period by program offices, although it rarely is. When used properly, cost analysis could be used to baseline efforts and schedules, limit requirements growth by estimating each requirement's cost impact, and identify costs of needed additions. Cost analysts should become part of the technical team, identifying systems and cost and measuring impact immediately to the program. When properly applied, cost analysis permits a process to conduct accurate trade-offs,[4] and provides information far in advance of cost schedule control systems (CSCS)[5] reports, giving PMs more time and more accurate information to make decisions.

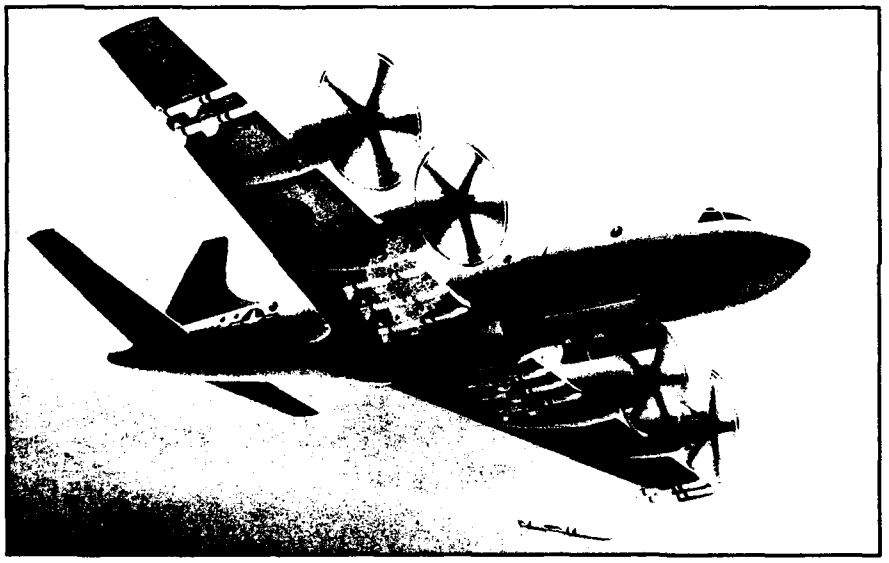
Several reasons could explain why cost analysis has not been embraced by PMs as a management tool. The defense department's emphasis on performance aspects and then programmatics[6] for weapon systems may be interpreted to exclude cost as an evaluation criteria; or, perhaps, PMs' reluctance to deal with bad information during their "watch." After all, if a cost analysis revealed the program was headed for trouble because cost analysis was indicating an overrun, the PM would have to take action immediately. Without such a report, the PM has more freedom to obfuscate actual progress by writing off delays to "technical redirections."

Cost analysis is a complicated discipline requiring years of training and understanding to do well. Actual benefits from performing cost analysis are not well documented because cost analysis has been viewed by many PMs as "something they have to do" to pass a milestone decision rather than "something they want to do." Several reforms could be put in place that could help improve the benefits from cost analysis; they include training, standardization and standards of conduct.

Training

To be an effective cost analyst requires understanding the technical aspects of a program, and being able to collect and extract information from various people and technical documents. Knowing where to look for cost-driver information and knowing the right questions to ask developers is critical to doing a good job. In addition, a cost analyst needs to understand financial statements, cost accounting standards, and acquisition regulations. Formally, this may be indicative of needing business and engineering degrees. However, maximum gain would be derived by assigning junior cost analysts rotational assignments through different disciplines to obtain the necessary insight to play a major role in program decisions.

"Where were the auditors assigned to examine and report on thrift institutions?"



P-7 (illustration courtesy of Lockheed)

Assignments in a contracts department would provide opportunity to see how the government works with contractors on a formal basis. Analysts would become familiar with cost and pricing information, auditing, administration of contracts, negotiating and acquisition regulations. Appointments in a program office would familiarize analysts with matrix organizations, the program planning and budget cycles, compromising, formal briefing techniques, and technical leadership. Temporary tasks in budget, engineering or other smaller departments would also tend to make analysts more understanding of the entire environment.

Work assignments should be supported with a formal training program, by having cost analysts attend approximately eight training courses offered throughout the defense department. This provides theory and basis for rules in place, and documents furnished with the courses would be sources of reference for future work. As analysts become more seasoned and skilled they should be sent to industry- and defense-sponsored conferences to collect information and interface with industry counterparts.

Lastly, junior analysts should be assigned a mentor to guide their careers and be able to support their work assignments.

Standardization

There is probably no better example that could be given than in the field of cost analysis where standardization would greatly improve the acquisition process. Decisions made daily

use cost information as a basis for alternative choices. Yet, frequently the information is incomplete or otherwise flawed, resulting in a poor basis for making choices. Managers must have accurate information in order to make sound decisions.

One way toward achieving this goal of providing accurate information is to develop a common cost database that would be available to cost analysts and PMs. When someone wants to know, for example, the replacement cost of an F-18 or ARC-210 radio, he could look it up in the common database. The COEAs and other cost studies would have to use the database and therefore reduce the amount of subjectivity in cost estimates. With this type of information available at the PM level, decisions could be made at a much lower level in the organization chain. This database would also be conducive to conducting more trade-offs between performance and affordability, and doing so earlier in the program life cycle.

A more demanding standardization program would include standardizing accounting systems for defense contractors, standardizing cost instructions for RFPs, and developing a set of standards for conducting cost analysis. Having common cost reporting systems for all contractors would allow easier comparisons at lower levels of financial reporting, allowing the customer to measure and compare productivity and efficiency between bidders. At the present time comparisons are almost impossible to make because each contractor has a unique accounting system and costs are reported differently.

Common cost instructions would save contractors considerable bid and proposal expense because they would not have to devote so much time to understanding and complying with individual RFP cost instructions. Perhaps they could use the savings to compete more on other programs. Standardization of accounting systems and knowing the customer is using the information to measure productivity and efficiency may also force contractors to look for ways to improve efficiencies and, thus, become more competitive. More commonality in reporting, collecting and evaluating should tend to increase competition.

Standards of Conduct

During the past several years, we have witnessed the collapse of the savings and loan industry and the subsequent question of: "Where were the auditors assigned to examine and report on thrift institutions?"[7] We could extend this same type of question, albeit on cost estimators, when we look at the many programs canceled by the Pentagon, such as P-7, A-12, and perhaps the C-17. While the blame for these programs cannot solely be attributable to optimistic estimates, clearly something can be improved in the review process. Questions such as "Did we really think we could buy the A-12 development program for about 35 percent of the F-22 development effort?" should be asked before committing to major programs.

No one seems to gain when a major program is canceled.The government falls behind in replenishing its fleet in a optimally planned fashion; it loses congressional support for the program; and morale drops among its employees. The contractor is faced with layoffs, angry stockholders, and defending itself during termination procedures. The taxpayer ends up paying for defense programs with no deliverables and unemployment compensation benefits.

Congress has reacted to the savings and loan fiasco by introducing a bill, "The Financial Fraud Detection and Disclosure Act." The bill requires auditors to report problems in accounting earlier and prevents retribution for whistle-blowing. Perhaps the defense department should take the initiative of reengineering cost analysis before it is forced to do so by an independent agency. Rather than look upon cost analysts as public accountants with a hidden agenda of overestimating program changes, PMs should view cost analysts as managerial accountants able to identify work areas that are performing well and those needing attention.

Initiatives to improve cost analysis could include recognizing a certification society to determine independently standards for certified cost analysts with the implication of disciplining cost analysts who certify poor estimates. Another idea would be to have cost analysis supported by an office independent of the PM and, therefore, remove the PM's ability to strongly influence the estimate. This step needs to be debated because it removes the PM's total responsibility for the program. Then again, the PM may be pleased to have someone else break the bad news on an underfunded, underestimated program.

Endnotes

1. Department of Defense Instruction 5000.2, "Defense Acquisition Policies and Procedures," 23 February 1991, Part 4, Section E.
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3. "Estimating Systems," Defense Federal Acquisition Regulation Supplement, para. 215.811.
4. Baumert, J., and McWhinney, M., "Software Measures and the Capability Maturity Model," Software Engineering Institute, Carnegie Mellon University, CMU/SEI-92-TR-25, September 1992.
5. Department of Defense Instruction 5000.2, 23 February 1991, Part 11, Section B.
6. Perkins, Russ, "NAVAIR's Source Selection Process," Section 4, "Support - The Foundation of Power."
7. Donlan, Thomas, "A Bigger Whistle - Congress Pushes Accountants to Be More Accountable," *Barron's*, 5 July 1993.

ARCHITECTURE II: THE PROTOTYPE

Flexibility Through Discipline

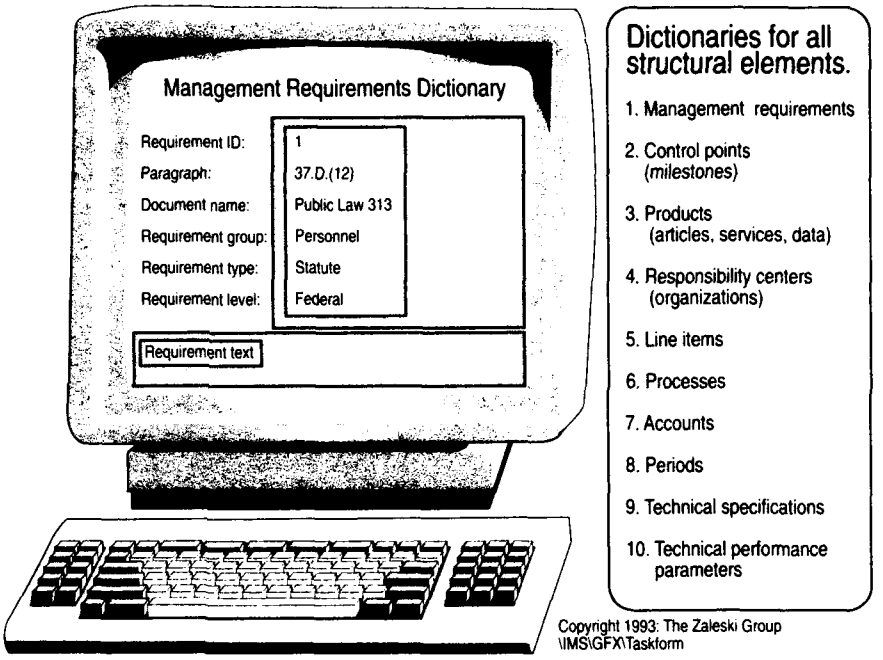
Joseph R. Zaleski

Since my article, "A Toolkit for Program Management Architects," was published in the July-August 1992 *Program Manager*, more than 100 readers have contacted me about the architecture, the proof-of-concept implementation, or the Toolkit. I have distributed more than 60 copies of the Toolkit. In developing this, the "prototype" version of the architecture and the Toolkit, I have addressed all of your inputs and suggestions except provisions for graphic fields in records, which will be included in the Paradox for Windows® version, since the environment there is specifically designed to support them.

I have been gratified by the responses — the intellectual combat as well as the support and agreement. I hope the integration of text, illustrations and computer displays/reports in this article meet the need you have expressed to be able to "visualize the architecture and its implementation conceptually, logically and digitally."

There are two major differences in this version of the architecture. First, small changes in the elements of the architecture and the data model to satisfy the needs of many of the nonacquisition users and, second, a much less hateful user interface.

FIGURE 1. Stuctural Element Definition



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\IMS\GFX\Taskform

The Architecture of Government Operations

In the inherent complexity of government operations, there is one constant. Whether policy is being made, legislation is being passed, or the result is being implemented, people or groups of people must physically perform tasks — work. The Architecture of Government Operations supports automated tools for managing complexity by identifying and defining a structural framework for government operations to serve the same purpose as the structural elements of physical systems.

The integrated framework of the architecture provides three distinct but related functions. It provides a thread to tie the plans, tasks, resources, schedules, products, performance and actual expenditures of the government operation to the "mandates" it is required to satisfy. It provides the capability to view the operation from a number of different vantage points with relation to the others. It is the

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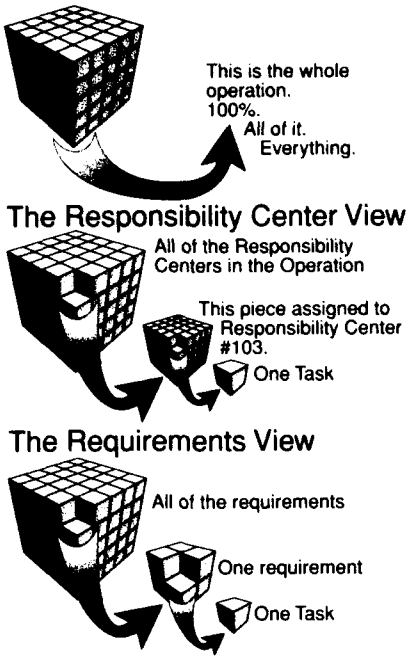
FIGURE 2. Representation of a Government Operation



foundation of the data model implemented by the automated database.

Complexity

Some of the issues that face us today are almost obscenely complex.
—Vice President Albert Gore, Jr.

There are different types of complexity. A methodology that reduces one type may only make the others worse. The architectural approach contains features to deal with all five of these complexity types.

—**First.** *Conceptual complexity* requires the combination of the right brain creativity of the artist, the left brain processing of the scientist, and the dexterity of the politician. It produces top-level policy and authority to proceed. You could call this the "what-to" complexity.

—**Second.** *Operational complexity* or conceptual logistics is the translation of the concept into what it takes to bring it about. It is maintaining the integrity of the concept while defining the who, what, when, where, why, with what, what-if, what-now and the interfaces between them. This is the "how-to" complexity.

—**Third.** *Communications complexity* arises directly from the nature of the communications required to complete a task, not from the task itself. In an operation with extremely complex tasks where every person must interface with every other person, there are n(n-1)/2 interfaces required. In a team of seven people there would be 7(7-1)/2 = 21 interfaces required to do the task. In a team of 100, there would be 4,950 interfaces on each task requiring this level of interface! Think of this as "who-with" complexity.

—**Fourth.** *Task complexity* is the actual performance of brain surgery, painting the masterpiece, writing the algorithm, programming the computer, milling the part, welding the joint. This is "being-able-to" complexity.

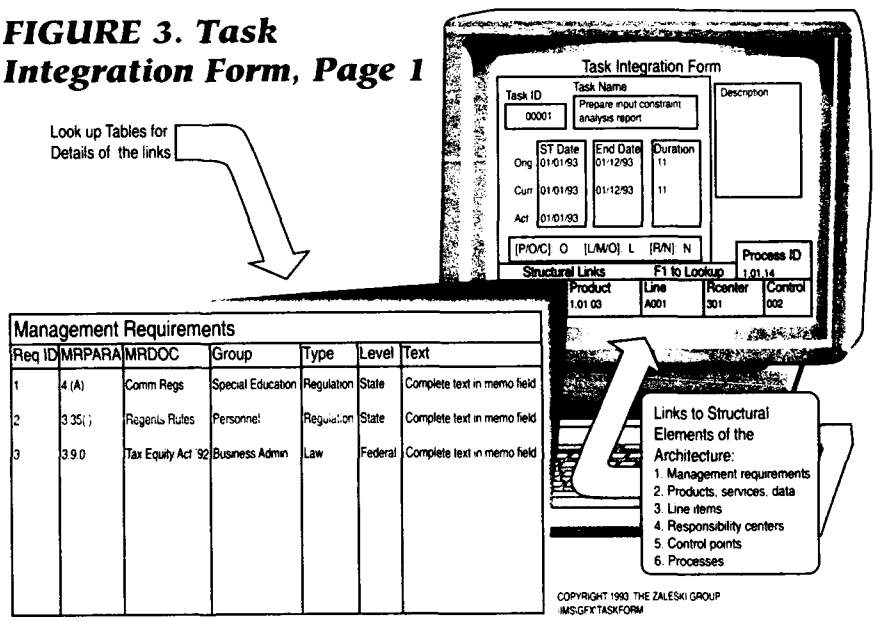
—**Fifth.** *Turf complexity* is the unnecessary but almost universal complexity arising from the desire of each subsect to gain and hold an ever-increasing amount of turf. This complexity stems from the need for elaborate structures to impose conflict control in the turf-wars, and is increased by the efforts of people to bend the regulations in their own favor. This we should call "ego" complexity.

The Nature of a Government Operation

In its most general form, a government operation is prescribed work performed by a group of participants under the scrutiny of constituents or constituent groups, each of which may have different objectives. In almost all cases, the policy, legislation and implementation are accomplished by different participants.

For example, the President establishes defense policy, Congress passes the budget appropriation and authorization legislation, and the Department of Defense and branches of the Service formulate regulations that become the mandates under which various programs are implemented by Service members, civil servants and contractors. The Supreme Court spends most of each term resolving conflicts between legislation and the implementing regulations of the executive departments. This, in effect, creates another form of mandate — the court decision.

FIGURE 3. Task Integration Form, Page 1



List of Related Perspectives

***Vantage Point* - Definition**

Management Requirements - The ground rules and constraints for the operation: mandates, statement of work tasks, etc.

Accounts - Financial accounts indicating the source of funds.

Control Points - Schedule milestones, analogous to manufacturing steps, used to show how many items have completed an evolutionary step.

Periods - Uniform accounting periods for measuring financial and technical performance.

Products - The things, services and/or data produced by the operation.

Responsibility Centers - Who or what organization is responsible for task performance.

Line Items - A method used to identify deliveries, lots or appropriations separately.

Processes - The names of the methods or procedures for doing specific parts of the operation; for example, a planning process or a negotiating process.

In the same fashion, the federal government and the state legislature generate statutes governing educational programs. There are regulations and court decisions at both levels. The total group of statutes, regulations and court decisions is referred to as "educational mandates." The local school board adds to this group through their decisions.

Creating this mandate produces no results. It sets up the ground rules and constraints. People or groups of people must physically perform tasks — work — to see results. Architecture and the Toolkit combine to establish flexibility through discipline to allow people to perform successfully under extreme complexity.

Architecture deals with implementation. It assumes the existence of a top-level, clear idea of the objective — successful handling of "what-to" complexity. Broadway Producer David Belasco says, "If you can't write your idea on the back of my calling card, you don't have a clear idea." A calling card is 3.5 inches wide and 2.0 inches high; the preamble to the Constitution of the United States will fit in a space this size.

When we talk about the objective or the laws, rules and decisions of the courts, we are discussing ground rules and constraints for future conduct. However, none of us knows for certain what will happen tomorrow. In other words, we have no truth about the future. We have only our understanding of the present, our knowledge of the past, the integrity of our projections, and the discipline of our efforts. The architecture and the Toolkit help us integrate understanding, knowledge, projections, discipline and effort.

Perspectives and Structural Elements

Your view of an operation depends upon your perspective, and your perspective depends upon your vantage point. In other words, where you stand depends upon where you sit. The table contains a list of the names of the vantage points in the architecture and a brief description of the perspective from each. You are probably already

FIGURE 4. Task Integration Form, Page Two

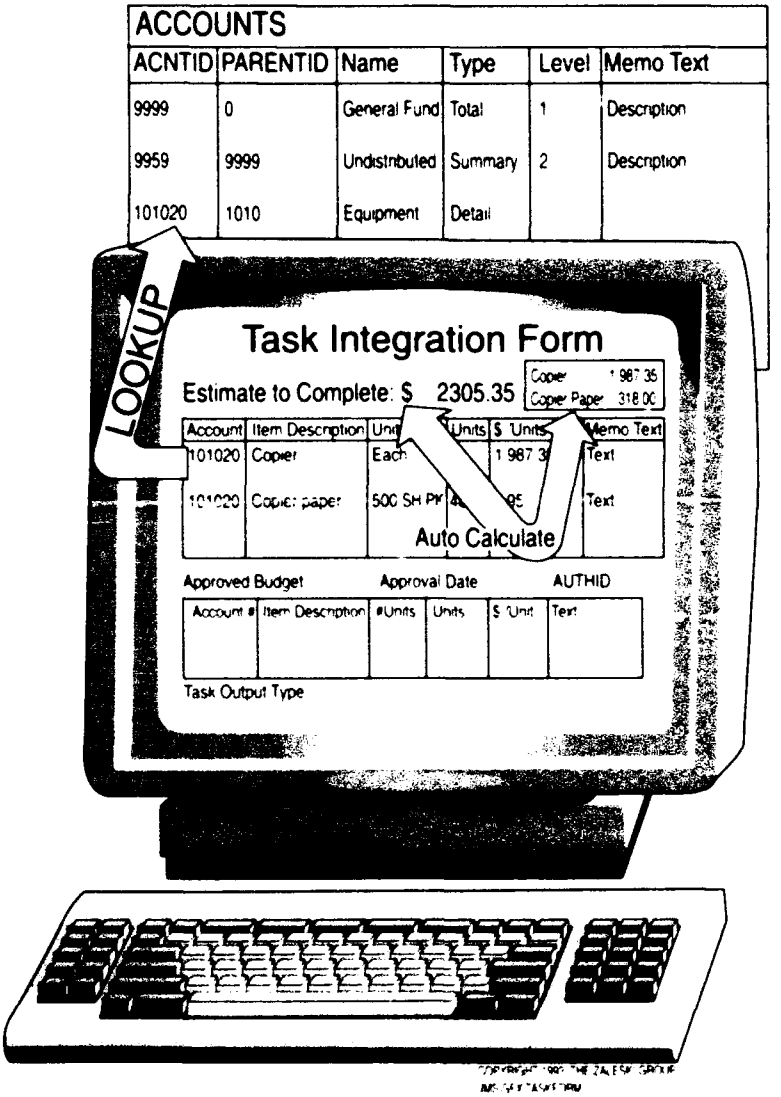
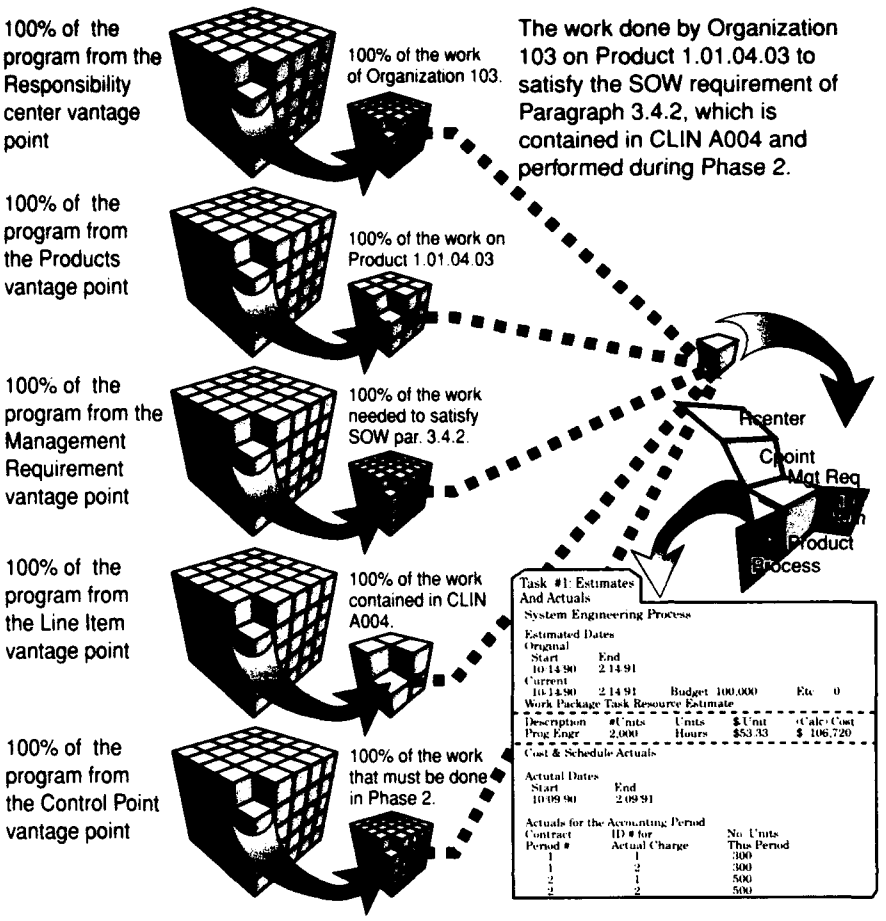


FIGURE 5. The Integrating Function of the Task



familiar with most of them; you've just called them different things. The architecture and the Toolkit work together so the view you get from each of these vantage points is a view of the whole operation as seen from that vantage point. For example, all the money and all the time will be spent meeting the total package of management requirements. It will also all be spent by the operation responsibility centers. Similarly, it will all be spent on the whole operation as seen from the other vantage points. Figure 1 shows the computer screen used to construct the vantage points and other structural elements.

If we represent a government operation from any one vantage point as a cube, it is made up of smaller cubes, each representing one of the subdivisions from that perspective. Look at Figure 2; it's worth a thousand words of further explanation.

Notice, there is a task at the bottom of any representation. If you think about it for a minute, you'll see this is logical, because nothing gets done unless someone does it — performs a task. Since each vantage point represents the whole operation, we know each task must be a part of one of the subdivisions of each vantage point. For example, each task belongs to a responsibility center; each task must contribute to one of the products; each task must be part of one of the processes, etc.

As an arbitrary example, we might want to know our costs for meeting one mandate — by responsibility center, line item, control point and product. If we had to go through a stack of spreadsheet budgets, extract these figures, and total them, it might take forever and the probability of numerical error would be quite high. In addition, if the original planning did not contain these subdivisions, someone would have to make allocations among the vantage points based on judgment rather than actual data collection.

If, on the other hand, we use the vantage points as the structural elements of an architecture captured in a computerized database, the information is related as soon as it is entered, and the computer handles all the complex data selection, combination, sorting and output. It would be as simple to provide the perspectives in any order, or to leave some out. In other words, we could show only how much money one responsibility center was going to spend on one product during the life of the operation. Or, from a scheduling vantage point, we could show the task starting and ending dates by responsibility center or by control point/responsibility center/product, or other combinations.

Tasks: The Structural Integrators

From the previous discussion, we know the tasks must be the glue that ties all views of the operation together. We know, also, that we want the computer to keep track of all the tasks and the piece of each vantage point to which they are connected. To do that, we need to have the computer build a form that lets us designate the relationships while enabling it to track the results.

Tasks consume resources and produce outputs, so we need a way to list all the resources, their estimated costs, and all the outputs we expect from the task. The resources must be funded from somewhere, so we need to be able to find the account numbers for the estimates and the actual expenditures. And, of course, we need to keep track of the accounting periods when the money was spent.

FIGURE 6. Multiperspective Report Demonstration

MANAGEMENT REQUIREMENT 2: SYSTEM DESIGN
| RESPONSIBILITY CENTER 4: CC&M ENGINEERING
| | LINE ITEM A001: FIRST UNIT
| | | CONTROL POINT: 1: SYSTEM DESIGN REVIEW
| | | | PRODUCT: 1.0: INTEGRATED MANAGEMENT SYSTEM

TASKID	TASK NAME	BUDGET	EARNED VALUE	ACTUAL COST	BAC	ETC
1	Mission Requirements Analysis	1,133.85	1,133.85	2,046.00	1,133.85	0.00

| | | | | | PRODUCT TOTAL >> APPROPRIATE SUBTOTALS <<

===>>>FORMAT REPEATS TO COVER ALL TASKS/PRODUCTS/CONTROL POINTS/LINE ITEMS/RESPONSIBILITY CENTERS/MANAGEMENT REQUIREMENTS<<<===

| | |-|-CONTROL POINT TOTAL >> APPROPRIATE SUBTOTALS <<
| | | CONTROL POINT: 2: PRELIMINARY DESIGN REVIEW
| | | | PRODUCT: 1.0: INTEGRATED MANAGEMENT SYSTEM
| | | | |-PRODUCT TOTAL
| | | |-|-CONTROL POINT TOTAL
| | |-|-|-LINE ITEM TOTAL
| |-|-|-|-RESPONSIBILITY CENTER TOTAL
| RESPONSIBILITY CENTER 5: CCM MANUFACTURING
| |-|-|-|-RESPONSIBILITY CENTER TOTAL
|-|-|-|-|-MANAGEMENT REQUIREMENT TOTAL
MANAGEMENT REQUIREMENT 3: PRELIMINARY DESIGN
PROJECT TOTALS:

>> APPROPRIATE TOTALS FOR PROJECT <<	5,033.85	5,033.85	3,183.50	20,178.85	15,352.75

Let's look at an illustration of the task form. Since it contains so much information, it uses two pages and shows up on two computer screens. Figure 3, Page 1, of the Task Form, has an area for task name, ID #, description and original, current and actual starting and ending dates, and duration. The task can be identified as follows: [Planning, Open, Closed], [Labor, Material, Other Direct Costs], [Recurring, Nonrecurring].

Along the bottom are boxes that tie the task to each of the structural elements of the architecture (vantage points). These special boxes, shown in Figure 3, open to let you see the entire table of all the items in a structural element and pick the one to link to the task. Figure 4 shows Page 2 of the task form with details and look-up link between the task item estimates and the accounts table.

Figure 7 shows how the computer sees the information you enter but, first, look at Figure 5 to see how the cube representations and the computer screens come together at the task.

Questions and Answers

Once the data is entered into the database using the forms in Figures 1, 3 and 4, you can ask questions about how your operation is doing and let the computer look up the right information, calculate the results, and display the resulting report or graph. Basically, you ask questions about your operation and the computer looks at the data you have used to describe your operation; selects the appropriate records; combines, calculates, sorts and answers your question.

Answers can be provided either on screen or in printouts. They can be in the form of reports, letters, mailing labels, graphs, Gantt charts, etc. The answers can be as simple as a dictionary of mandates or as complex as a listing of each mandate, its level, which responsibility centers spend money to meet it, which products this money becomes a part of, and which work is done to meet which control point. As shown in Figure 6, the output can be formatted with graphical characters to separate the vantage points and to highlight which vantage point is the primary and which are subordinate for a particular output. This display technique is similar to the one used by code generators employed by computer programmers to visually indicate which processes are nested within others.

Figures 8 and 9 are included to provide examples of two graphs with which you may be familiar, but which

FIGURE 7. Project Architecture

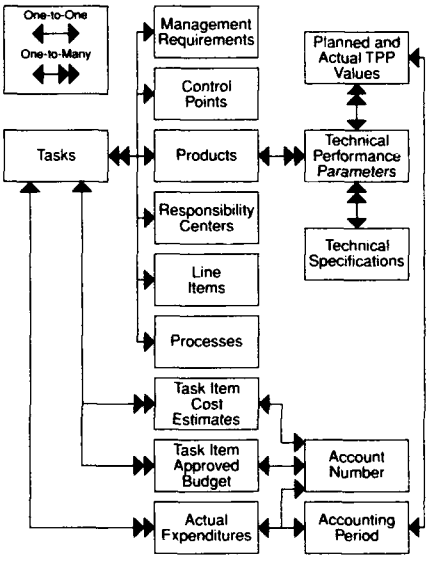
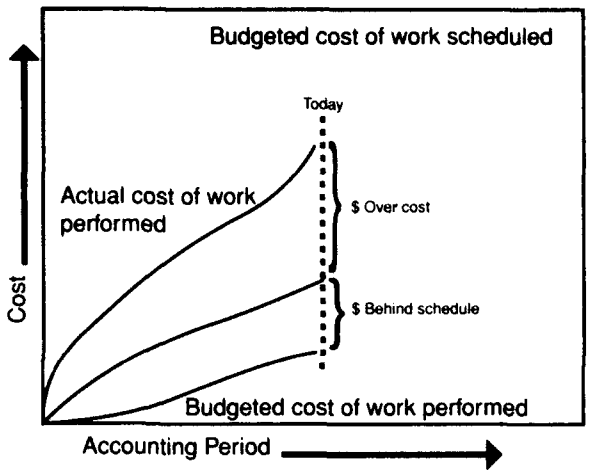


FIGURE 8. Cost Performance



have expanded capability in the Toolkit. Figure 8 is a cost-performance graph showing budget, earned value and actual costs along with the current overrun/underrun and the dollar value of the schedule slip/acceleration. The unique thing about the architectural approach is it lets you build these graphs for any of the structural elements. For example, you can develop these graphs for management requirements, accounts, products or control points, etc.

Figure 9 shows a technical performance parameter profile with the specified value and achievement to date. The architectural approach makes this facility available to each product type — things, services and data. This provides the unique capability to measure service performance against any criteria contained in appropriate plans.

Many of the reports and graphs are programmed into the application; but, in every operation, participants discover some new perspectives from which they would like to see their data. The combination of a fundamental architecture that addresses multiple vantage points and the flexibility of a commercial database package like Paradox® makes the addition of new output reports and graphs and the queries that generate them as easy as possible. *Ad hoc* queries can be performed interactively. Report and graph specifications can be developed without programming. When queries and new output requirements stabilize, they can be incorporated into the application by simple modifications to the program to add them to the output tables.

If all operations within a government entity were to adopt the architectural approach, the "shape of the table" would be established and the focus could be on persistent cooperation among all parties to achieve the objective. Reviews at higher levels could be done using the actual data and Toolkit computer program at the implementing agency via modem and remote control program. For example, I use an old, $100 remote-control program called Takeover to provide site support from my office to clients at various locations. This program allows either of us to operate the Toolkit software at the client's site, while both of us see the results as displayed on the client's screen.

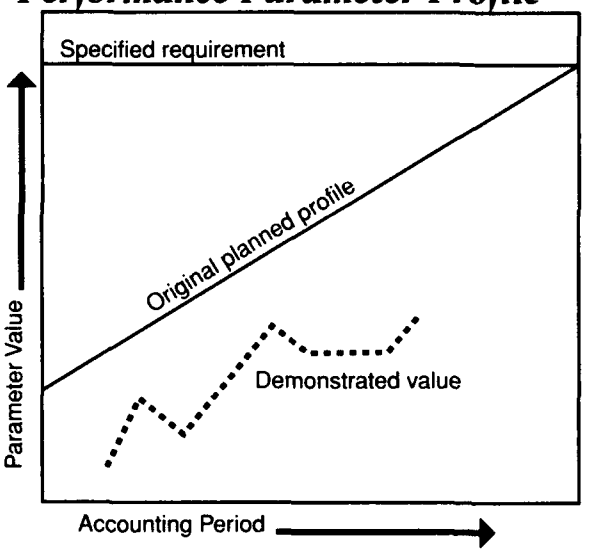
The benefits to a government entity of adopting the architectural approach are numerous. The following are just a few: (1) data integrity is ensured — there is no massaging between the work and the report since the aggregation and relationship rules are established; (2) no travel is necessary to review program data; (3) since data can be aggregated to the top level for each site or deconstructed to the task level to do complete investigations of problems, no special briefing formats are generated; (4) the architectural relationships can be defined in relational database terms; (5) since there are a number of commercially available database programs for personal computers that can do the job and existing C/SCSC systems can be adjusted to implement the architecture, the entry cost is within the means of any government entity and its suppliers.

In this age of downsizing, reductions in middle management, government "reinvention," and budget cuts, it may be time for our ability to use technology to catch up with the technology that is conveniently available.

It is definitely time to recognize that discipline and structure do not reduce flexibility but, instead, flexibility arises from the discipline of our efforts. When each team member performs a defined role, the team has the flexibility to meet both complexity and the unknowns of the future.

Understanding the structural framework of the architecture, the integrating role of the task, and the proper functions of the WBS, SOW and other structural elements, makes possible the reduction of ego complexity and the growth of persistent cooperation. The function of the proof-of-concept and prototype computer programs of the Toolkit is to facilitate this understanding and its implementation.

FIGURE 9. Technical Performance Parameter Profile



PROCESS, ISSUES, GOAL

ASSESSING THE MILITARY INDUSTRIAL BASE:

Air Force Space and Missile Systems Center's Technique

Ed Houston

During the past three years the Air Force Space and Missile Systems Center (SMC) Manufacturing Engineering Division, in cooperation with the Wright Laboratory Industrial Base Analysis Division, conducted innovative and proactive industrial base assessments of the manufacturing base supporting their key programs. The assessments supported congressional interest[1] in the DOD industrial base and were in compliance with new DOD acquisition directives/instruction (DODD 5000.1, DODI 5000.2 and DODD 4005.1).

Four major satellite programs and one expendable launch vehicle (ELV) program participated in these studies. Focusing on selected second, third, fourth and lower-tier companies, the studies provided each program manager with an in-depth view of the program's industrial base with specific information on the health of key suppliers.

As a result of these studies, management recommendations were supported which focus on (1) improving government management of contract-

NAVSTAR/GPS

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INTRODUCING ISAC

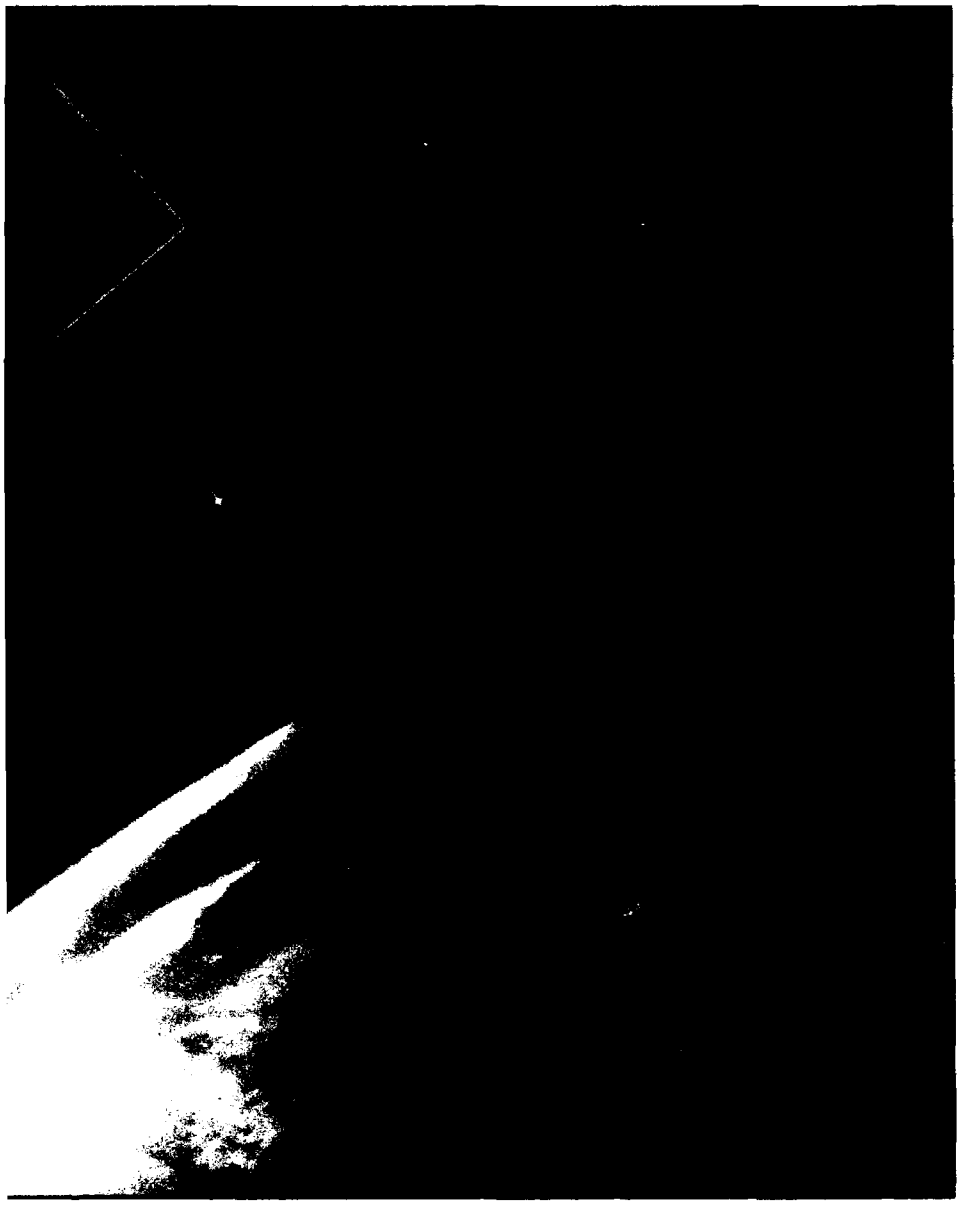
THE INTERMEDIATE SYSTEMS

ing processes, (2) information dissemination to the DOD industrial base on proposed future weapon system procurements, and (3) education of program management personnel on using these processes and techniques to reduce cost and schedule overruns.

Satellite Studies

Two satellite studies were conducted in FY 1992. The first study focused on the key upper-tier contractors while the second focused on key lower-tier contractors. Data from more than 280 contractor site visits were documented. A team of analysts and Air Force managers studied the findings, assessed the risk of the producer and/or product, reviewed the key issues, and provided recommendations to the program managers.

The process used by SMC to collect and analyze industrial base data is new and creative. Aggressive problem-solving methods identifying company relationships and the impact of problems in lower-tier companies, coupled with insightful analysis, have identified problems and derived solutions that will save the government millions of dollars in system acquisition, and maintaining lead times.



This article presents the data collection methodology, risk assessment process, examples of the types of issues, and the advantages industrial base analysis can have on system acquisition cost. This process has been tested and proved at SMC and is being used by the NAVSTAR Global Positioning System, Defense Meteorological Satellite Program, and MILSTAR Program Offices.

Data Collection and Analysis Process

While surveys are relatively inexpensive data gathering mechanisms, companies usually provide data that are descriptive from their point of view only. Consequently, it is important to recognize that independent data collection utilizing a visit to the company location is the best method to gather data and make accurate risk assessments.

The process outlined in this article (see Figure 1) was developed by SMC and QuesTech, Inc., and proved to be efficient and accurate in evaluation of companies. Data collection and analysis are accomplished by independent experts who strive to represent accurately the interests of government and industry, always attempting to achieve a "win-win" situation.

Process developers used a four-step process to identify, contact, visit and analyze the companies.

(1) The developers contacted, by telephone, a senior-management point of contact in the company. A short description of the study was followed by a telefaxed copy of an Air Force authorization letter and the first set of work sheets.

(2) Within a few days after the initial contact, they made a second call to the company contact. The purpose of this call was to establish an appointment for an on-site visit and ensure the telefaxed letter and initial

work sheets were received. Most company managers welcomed the visit. They viewed it as an opportunity to pass issues, information on new product development, and concerns directly to the program offices. *Note:* At the beginning of the assessment process, the prime contractors are contacted and briefed on the goals of the analysis. Prime contractor support augments the study in a positive manner by encouraging lower-tier contractor participation.

(3) On the appointment date, a representative traveled to the contractor's facility to conduct on-site interviews. The purpose of this meeting was to allow the company managers to talk freely and openly about their concerns and issues and to identify the DOD industrial base situation from the contractors' perspective. It gave the representative a chance to answer questions provided by the company on the initial work sheets. After the interview, if there was available time, a tour of the facility was requested. The purpose of this tour was to form a general impression of the company's production technology, processes and utilization.

(4) Finally, the representative completed an in-depth analysis of the accumulated data and documented the information in a short report. The report evaluated the company status and its products in relation to programs supported. These data were then entered into the Space and Missile Industrial Information System (SAMIIS).[3] To ensure recommendations are completed, actions and follow-up are managed using SAMIIS and an automated contact management system.

Risk Assessment

After each site visit, analysts reviewed the findings and made an evaluation of potential risk on each company and the program-related product they produce. To evaluate the companies, criteria were established which included a range of factors, including equipment, materials, technology, financial, political, marketplace, personnel, and governmental intervention.

Included in the criteria were three levels of company risk which were defined by the SMC Manufacturing Engineering Division to add continuity to past and future program studies.

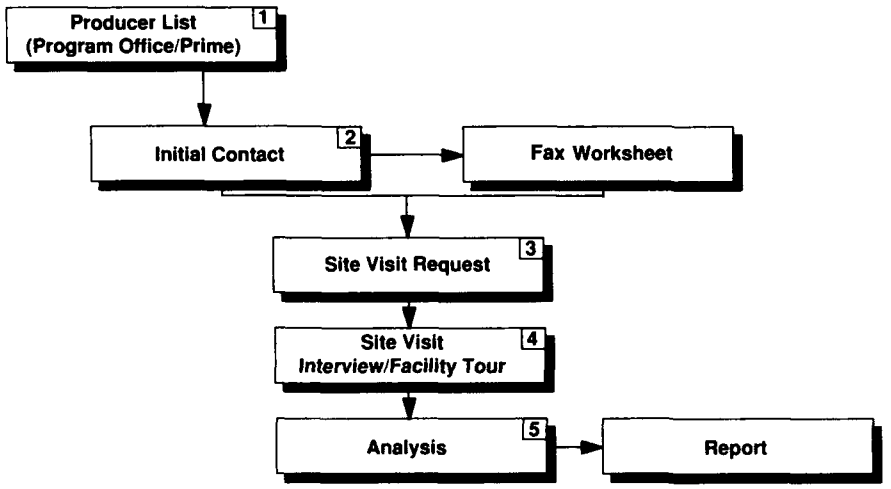
Low Risk. The company demonstrated ability to meet production requirements of known present orders through the 1990s.

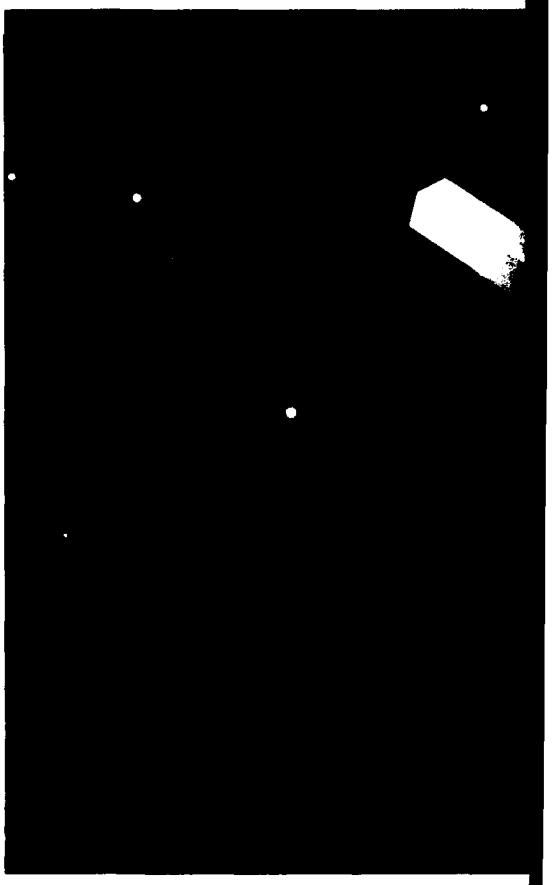
Medium Risk. The company had the desire to continue production, but some of the factors (listed above) were a possible detriment to the ability to perform and meet production requirements within the next five years.

High Risk. The ability and/or the desire of the company to continue supplying the product within the next two years is in question.

Risk ratings are the basis for initiating actions to solve the problems noted during the study. A company evaluated as a high risk will receive immediate attention from the appropriate program manager and/or the manufacturing engineering staff. Program offices are notified immediately of high-risk situations to permit evaluation in addressing a course of action. Program managers are briefed periodically on high- and medium-risk companies and a report generated at the end of the study provides risk evaluations and recommendations with program-related information on all companies analyzed.

FIGURE 1. Data Gathering Methodology





MILSTAR

Figure 2 depicts results of the three industrial base studies. Approximately 34 percent of the companies evaluated were either high or medium risk. Additional companies will be evaluated in future satellite studies.

Continuous monitoring of high- and medium-risk companies is crucial. During the study, some low- and medium-risk companies encountered new problems resulting in higher ratings; some high- and medium-risk companies solved their problems and were reduced to lower risks.

After a site visit is completed, it usually is simple and inexpensive to update company status. Follow-up with company representatives usually can be accomplished by phone and/or facsimile transmission. Regular follow-up calls with the company keep the lines of communication open between the company and the staff or program office.

Industrial Base Issues

In addition to the evaluation of company risk, this industrial base analysis procedure is excellent for identifying issues in the contractor community. During face-to-face conversations, common problems which trouble contractors are identified and documented.

The single most significant issue affecting the satellite industrial base is the declining defense budget. Approximately 59 percent of the 288 companies visited felt the impact of the declining defense budget. Employee and corporate capability reductions were the most prevalent indications of cutbacks in military spending. Other problems included increased competition for available contracts resulting in longer procurement processing and increased time to get on contract for smaller companies, and increased lead times for high-technology materials and components.

Regional Issues

Analysts conducted visits throughout the country, with emphasis on the three major geographic areas which had the greatest number of identified companies: the West, East and Southeast. They made observations concerning the status of the industrial base supporting satellite systems in each area. In general terms, Western lower-tier contractors are having more difficulty, primarily because they are more exclusively dedicated to their aerospace business base. Eastern and Southeastern companies have a broader customer base including a more favorable commercial customer base.

Communications between upper-tier and lower-tier companies seem to be better in the Eastern region even though they are usually located farther apart. Eastern companies have a greater desire to invest their assets to expand their business. The Eastern banking sector seems to place fewer restrictions on their defense-oriented customers than counterparts in the West. This may be due to the favorable percentage of commercial work most Eastern companies enjoy.

Southeastern companies are experiencing steady growth in their commercial industries, but government work is lagging. This is due largely to the decision of most companies to build low-volume, labor-intensive components off shore.

Space (Satellite) Sector Issues

The space and satellite industry was classically characterized as primarily U.S.-sourced with high technology requirements, high unit cost, low production volume, small lot sizes, and lengthy production cycles. Quality and reliability were extremely important requiring the use of Joint Army-Navy (JAN) Class "S" parts and extensive qualification procedures for approval of design, parts and sources. More recently, however, the space industry is characterized by discontinuous production, less than state-of-the-art processes and manufacturing technologies (some of which are 20 or more years old), increased foreign dependence, and reliance on limited availability (or obsolete) parts and components.

In addition, increased Occupational Safety and Health Agencies (OSHA) and Environmental Protection Agencies (EPA) restrictions on emissions and discharges of materials such as cleaners, solvents and coatings require capital investment for compliance at a time of decreasing demand and general economic downturn. Companies indicate that this has led to dramatic changes in component processing, adversely impacted process documentation, and increased component lead times and costs.

Current military budget restrictions will have a negative impact on future weapon system support. While budget

FIGURE 2. Results of Three Industrial Base Analyses

	Evaluated	High Risk	Med Risk	Low Risk	H+M	(H+M)/ Evaluated
ELV Study Satellite Studies	135	19	27	890	46	34%
Upper Tiers	96	9	17	70	26	27%
Lower Tiers	192	31	41	120	72	38%
Totals	423	59	85	279	144	34%

reductions impact companies at all tiers, information available at this time indicates that the lower tiers feel the impact more severely than do primes and major subcontractors. The severity of the impact is related to the breadth of their business base. Generally, large companies have a larger and more varied business base than small government-oriented businesses.

In most cases, problems for lower-tier companies fell into the following categories:

a. Cash-flow problems surface quickly in small companies when orders are cut or delivery schedules stretched. One company indicated that its cash reserves have been exhausted in attempts to sustain a knowledge base.

b. Primes and major subcontractors are pulling work away from subcontractors and into their plants. Their objectives are increased business volume and employee retention. The result may be increased learning curves and qualification time which impacts program risk and cost.

c. Lower-tier, high-technology companies are refusing to do research and development (R&D) under present contracting (fixed-price) methods. These companies are highly dependent on production orders to recover R&D costs and make a profit. Decreased production orders provide no means to recover potential losses. Lower-tier company officials stated they need cost plus contracts to continue research and development work.

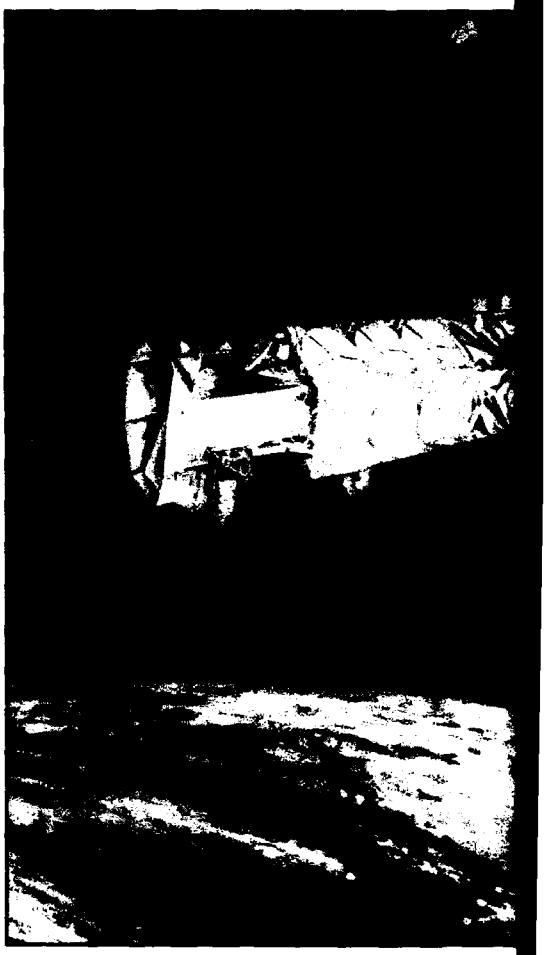
d. Small companies that are highly dependent on defense work (above 40 percent) are not faring well. This is especially true of those supporting programs that are vulnerable to cuts and/or delays. Companies with viable commercial markets are choosing to reduce or eliminate their defense business, especially if it is not profitable. These companies must be identified quickly because they tend to be very high-technology oriented and are generally sole or single sources with high qualification costs.

Declining Job Market

One of the most significant findings of this study was the impact the declining defense budget is having on the highly skilled jobs in the satellite industrial base. Some jobs require years of specialized training, but reduced orders are forcing many companies to lay off skilled workers and terminate narrow, government-only business lines.

Of 79 companies responding to the questions concerning personnel reductions, 61 had reduced their forces (23 by 50 percent or more), four had closed their military production lines and eight (including one which closed military production) had moved to commercial markets. This sample encompasses a small percentage of the total number of companies involved in production of military satellite systems, but is large enough to extrapolate the impact on personnel reductions. It indicates there is a negative trend, especially on the West Coast, and information from the companies suggests the situation is getting worse.

Some contractors are making corporate decisions based on the negative publicity they see in the media. They believe there is no longer a future in satellite program support and as a result are making decisions to modify or close their military manufacturing lines. They are ceasing internal research and development programs. These decisions ultimately reduce corporate capabilities, Independent Research & Development (IR&D) and jobs, and further contribute to the reduction of the U.S. military industrial complex.



Defense Meteorological Satellite

Materials Issues

Increased lead times for certain high-technology materials and components (especially "S" level parts) are a major concern for contractors and program managers. These special materials and components are usually exclusive to defense projects and require specialized techniques and processes. In many cases, they replace more profitable commercial processes. Reduced order quantities drive yields down and costs up, making what was marginally profitable work unprofitable. Overhead costs spread over a lower volume makes good producers less competitive under current contracting standards.

Lead times and delays are increasing for a number of parts and materials. Some of the associated follow:

a. A variety of problems in the high purity ferrite materials industry may result in the loss of two of the three suppliers. If this occurs, it will affect lead times, costs and quality in microwave guides and other similar parts.

b. The DOD is instituting a ban against certain fluorocarbon chemicals used for cleaning and processing printed circuit boards and parts. Defense contractors routinely use these products in their processes. The ban will force several contractors to halt their processes and may force some out of business, if acceptable alternatives are not developed. Materials facing prohibition include:

Class I -- Most potent ozone depleters

Group I Chloroluorocarbons (CFC)
Group II Halons
Group III All other fully halogenated CFCs
Group IV Carbon Tetrachloride
Group V Methyl Chloroform

Class II -- Hydrochlorofluorocarbons (HCFCs).

c. Declining defense orders forced some "S" level producers to stop manufacturing to Class "S" level specifications. Order quantities have fallen to the point of marginal profitability. A few contractors stated they will never reenter the "S" level market because the limited reward simply does not justify the risk. In 1991 the Defense Electronics Supply Center (DESC) had four qualified producers of JAN Class S transistors and diodes. As of January 1992, there were two.

d. The number of contractors capable of producing radiation hardened components is declining. Management of the last large certified manufacturer anticipates difficulty in producing radiation hardened components in the future due to the reduction in their suppliers' nuclear and ICBM business base. Many of their suppliers with unique facilities and capabilities will not remain in the business. Future demands for critical components will become difficult, if not impossible, to fill.

Unique California Issues

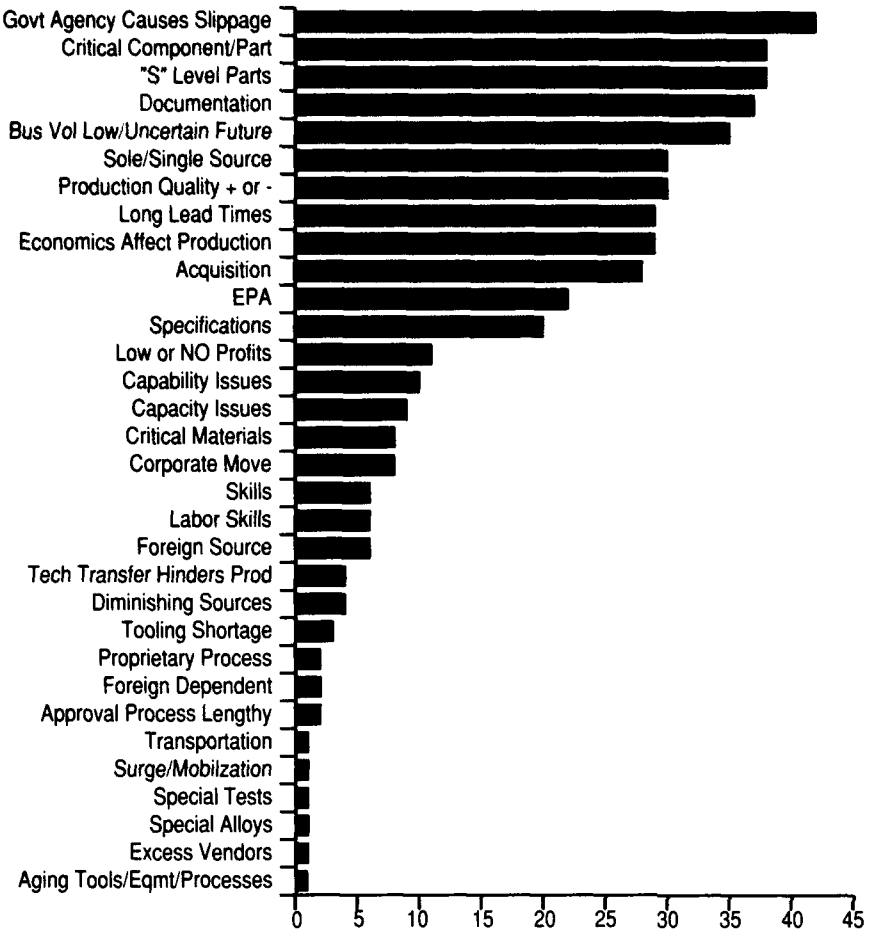
During this study, California contractors cited common concerns about the South Coast Air Quality Management District (SCAQMD), high medical and worker compensation premiums, failed lending institutions, and financial institution lending policies.

These issues seem minor in nature but, when taken collectively, they severely impact the California defense contractor's profitability. Consequently, some are planning to move out of the state. These moves may result in disruptions to program schedules due to setup and requalification requirements and could add significant delays to manufacturing processes.

The SCAQMD is charged with the environmental protection of Southern California, which encompasses Ventura, Los Angeles, Orange and San Bernardino Counties. It regulates the use and disposal of toxic chemicals and enforces these regulations through fines levied directly against the companies. The agency also issues permits allowing companies to use and dispose of chemicals used in manufacturing. A permit can cost manufacturers from a hundred to hundreds of thousands of dollars, depending on the chemical in use and its disposal criteria.

There is a secondary cost associated with management. Management-level attention (and, in most cases, a dedicated manager) is required to handle the paperwork associated with permit maintenance and control. These costs are eventually included in the end-item manufacturing price, making them less competitive than companies located outside SCAQMD jurisdiction.

FIGURE 3. Vendors' Issues



Currently, California employers pay higher health care and workers compensation premiums than any other state, and this cost is compounded by high rates of employee medical and stress claims. One employer stated his company's medical claims and litigation costs equal approximately ten percent of U.S. sales. Another employer of 41 stated his company's annual medical care and workers' compensation costs were $250,000. Work-related medical claims are on the rise. Some company officials confirmed that after a layoff, they expect approximately 50 percent of the released employees will sue for work-related or stress-induced injuries. Management costs associated with these cases can be very high.

Therefore, in most cases, companies settle out of court to reduce the legal and management costs associated with long litigations. Again, these costs increase the manufacturers end-item price and further contribute to noncompetitiveness.

Lastly, industry is telling us that lending institutions in the Southern California area will not recognize receivables from government contracts as legitimate receivables for collateral when applying for a line of credit. This forces small government-only contractors to use private assets for collateral on their line of credit. The companies believe this is an unfair practice and feel that a congressional bill should be introduced to halt this practice. (*Note:* this is a California phenomenon).

Vendor Constraints

Some of the key issues raised by vendors as constraints to their ability to provide products within cost, quality and schedule requirements are within government control. Although these same issues were identified during previous studies, little has been done to reduce their impact on the manufacturers.

Problems associated with specification change procedures, contract approval processes, government inspection delays, government parts supply management, excessive government documentation and paperwork are all very real to the company managers interviewed. These problems, created by the bureaucratic process, will continue to limit efficient business practices if left unchecked. Figure 3 summarizes the constraints identified by the contractors surveyed during this study.

Recommendations

As part of the industrial base analysis process, analysts provided recommended actions to reduce or mitigate risk for each company evaluated as a high or medium risk. The recommendations fell within various categories. The highest percentage of actions fell into the "Monitor Progress" and "Special Action" categories.

Follow-up actions were accomplished by Space and Missile Systems Center Manufacturing Engineering Division, the program offices, or the Wright Laboratory Industrial Base Analysis Division. In some cases, prime contractor intervention was required to resolve problems. Procedures were established to expedite the release of proprietary data and forward findings to the prime contractor for resolution.

Management Recommendations

The satellite analyses were not intended to gather the detailed information necessary to analyze every aspect of the subcontractors processes. The primary objective was to gather

supporting information to evaluate company and product risks. However, in the process of management interviews it became obvious the government must take actions to effect changes in management processes.

It was immediately apparent during site visits that many companies are making profit-motivated decisions to reduce or halt their business with the government. Actions by the government need to address the reduction of lead times required to contract for components and improve the customer-supplier relationships while maintaining the necessary quality and reliability.

The declining defense budget has created a climate demanding immediate action to address the core issues to prevent the further decay of our high-technology industrial capabilities. Timely information concerning proposed future weapon systems needs to be disseminated to all contract tiers when possible.

To help educate future Air Force leaders, intermediate and senior procurement course managers should present the SMC Manufacturing Engineering Division methodology for review and consideration for use DOD-wide. Ultimately, every program manager and staff member should understand the proactive approach to industrial base management and utilize these techniques to reduce cost and schedule overruns.

The Goal Is Proactive Management

The success of a program depends largely on the proactive efforts of the management team. Early problem identification is crucial. Gathering data to surface potential problems and solve them quickly is fundamental. Concentrating only on the program's single, sole and foreign source suppliers will narrow the total to be analyzed from thousands to hundreds. Analyzing these key suppliers through focused site visits and company/product analyses will quickly highlight approximately 30 percent as medium or high risk. Generally, this 30 percent creates 80 percent of the program problems.

With up-front knowledge and a cooperative spirit, much of the problem's devastating long-term effects can be alleviated effectively. Solving problems in the early stages will reduce cost overruns and program delays and improve quality and reliability in the long run.

Reactive program management always leads to "fire fighting" exercises, poorer quality, delivery delays and cost overruns. Some prime contractors unintentionally ignore long-term program concerns. They tend to focus on the crisis of the week. The data collection and analysis methods developed at Space and Missile Systems Center can aid program managers and their management teams in early problem identification and can amplify a proactive program strategy.

Conclusions

Previous industrial base studies focused on particular industries or materials. They looked at each industry from a total supply vs. total demand approach. Rarely could the findings from these studies be broken down to a level beneficial to the program manager. They provided no basis for proactive decision making and were ultimately given very little attention at the program-office level.

The industrial base studies conducted by the Space and Missile Systems Center provide a vertically integrated analysis of all companies and industries associated with a particular program. They start at the top level and research potential problems down to the lowest-level producer practical. In the process, the studies highlight the fact that many companies support multiple satellite programs. Consequently, the studies provide secondary information on problems which affect other programs. In addition, these studies comply with the requirements of DODD 5000.1, "Defense Acquisition," and DODI 5000.2, "Defense Acquisition Management Policies and Procedures."

The SMC studies proved the value of focused industrial base assessments. Although cost and schedule reductions are difficult to quantify, schedule reductions are realized as a result of early identification of failed businesses and immediate qualification of new product sources.

The cost of a proactive industrial base analysis effort is very inexpensive when compared to the cost of a program slip which could have been avoided. Proactive program managers need timely information to manage their industrial base issues, and this type of industrial base analysis will provide them with the information they need to deliver their systems on time and within cost and performance objectives.

Endnotes

1. In 1988, Avtex Fibers Inc., closed on short notice as a result of large losses and multiple EPA violations. At the time, Avtex Fibers Inc., was the only supplier of space-qualified rayon yarn used in the exit nozzles of space launch vehicle rocket motors. Also in 1988, Pepcon Inc., experienced a catastrophic explosion that closed the plant and eliminated half of the U.S. supply of ammonium perchlorate, an oxidizer ingredient for solid rocket propellants. These incidents raised congressional interest in how the DOD managed its industrial base.

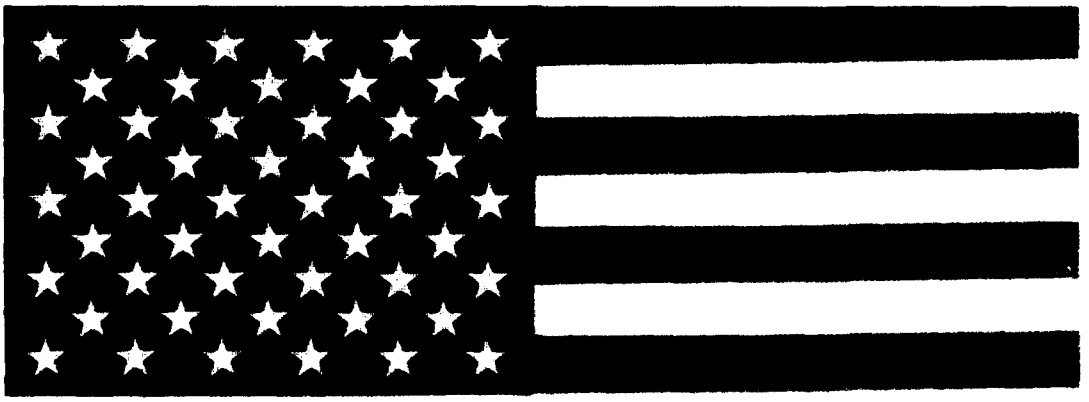
2. The SAMIIS is a user-friendly management information system permitting simplified and comprehensive analysis of industrial base information. The SAMIIS contains more than 3,400 companies, 650 programs, 3,560 products and 8,000 relationships.

DSMC RESEARCH FELLOWS HANDBOOK CONCERNS MODELING AND SIMULATION

Their Use in the Future Acquisition Process

Lieutenant Colonel Richard O. Roop, USAF

Along with the many discussions and information pertaining to acquisition reform, you may have heard the acronyms EXCIMS, DMSO and, now, ATFMS. If you have and understand who and what they are, you are way ahead of your colleagues. For those who have not heard about, or do not understand, these acronyms, this article will clarify them.



5,000,000 B.C. - GOD created Earth

4 JULY 1776 - GEORGE fathered the U.S.A.

21 JUNE 1991 - DEPSECDEF formed DMSO, EXCIMS

30 JUNE 1993 - DDR&E established ATFMS

2 AUGUST 1993 - DSMC initiated M&S Research

CAUTION: If you do not understand the first two events mentioned above, do not proceed! If you do understand the first two events, read on!

Background

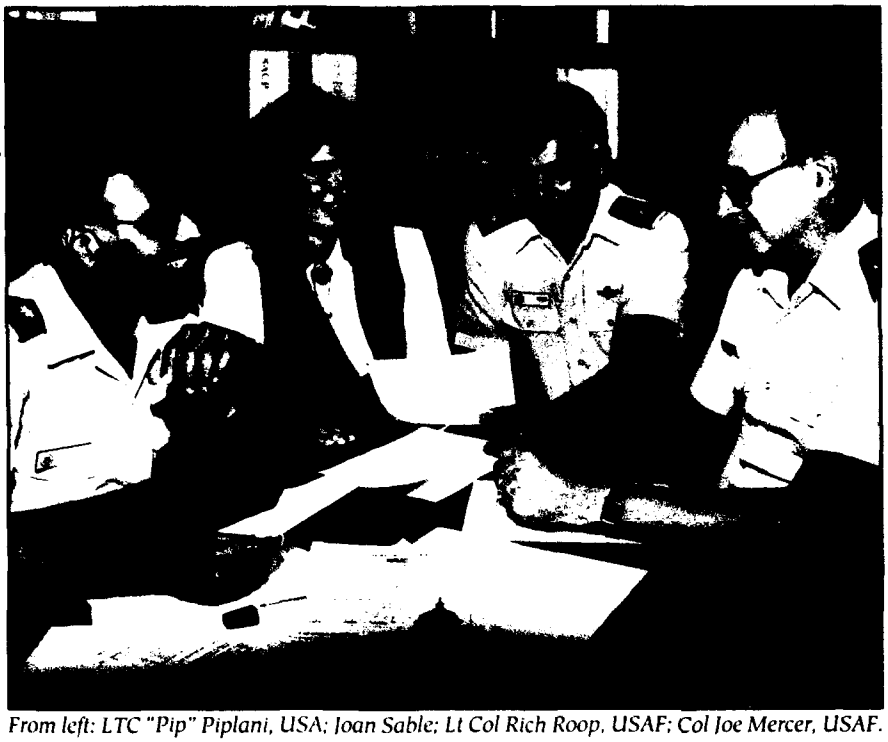
Modeling and simulation (M&S) are powerful tools to improve the acquisition process — such as improved, up-front analysis and definition of requirements, early simulation of the development process (design, test, manufacture, support, etc.), common shared databases, and the potential for conducting multivariate analysis in the complex "what if" world of the program manager. The bottom line is M&S saves resources.

Working toward that end, Dr. Anita K. Jones, Director, of Defense Research and Engineering (DDR&E), established the Acquisition Task Force on Modeling and Simulation (ATFMS), June 30, 1993. The ATFMS will report to Dr. Jones through the Executive Counsel on Models and Simulation (EXCIMS). Figure 1 may help shed some light on these relationships.

Dr. Jones selected Dr. Adelia E. Ritchie, Executive Director, Research and Information Division, Defense Systems Management College (DSMC-

Lieutenant Colonel Roop is a Research Fellow with the Research and Information Division at the Defense Systems Management College.

(Photo by Richard Mattox)



From left: LTC "Pip" Piplani, USA; Joan Sable; Lt Col Rich Roop, USAF; Col Joe Mercer, USAF.

to chair the ATFMS. Dr. Ritchie's ...r is to lead the task force in ...ing a baseline, incorporating M&S into the vision of acquisition reform, and recommending actions that will integrate the use of M&S into the acquisition process.

During the summer of 1990, two offices of the Secretary of Defense joined efforts to improve the Department's management and technology in the area of modeling and simulation (M&S). This led to the Deputy Secretary of Defense (DEPSECDEF) approving an M&S management plan and assigning the Under Secretary of Defense (Acquisition) (USD(A)), now the Under Secretary of Defense (Acquisition and Technology) (USD(A&T)), the responsibility in June 1991. This plan also established the EXCIMS and DMSO. The EXCIMS is an advisory group to the USD(A&T) on M&S policy, initiatives, standards and investments. The DMSO is the executive secretariat for EXCIMS; DMSO provides a full-time focal point for M&S activities, and promulgates USD(A&T)-directed M&S policy, initiatives and guidance promoting cooperation among DOD components. Many plans were made, but there was little movement toward implementation of any DOD-level policy changes.

Downward trends in the DOD acquisition budget provided a forcing function. During his testimony before the House Armed Services Committee in connection with the President's Budget, March 30, 1993, Secretary of Defense Les Aspin stated that "DoD is planning to undertake acquisition reforms that are even bolder than the Packard Commission proposed. Goals include streamlining and improving acquisition, simplifying acquisition guidance, and establishing joint civilian-military requirements."

Models and simulations are viewed as a vital aspect of acquisition reform.

Tools

Although M&S tools have become very sophisticated and enjoy broad application throughout the DOD, the impact of their use on programmatic decisions is not well understood. For example, at a Milestone III decision, one may ask: How do the model results that affected the Milestone II decision relate to the modeling used to support the current decision? Are prior results and/or models thrown out? Are lessons learned incorporated? Are models improved or validated with actual test data?

With this in mind, a study was needed to look at how M&Ss are used in the acquisition process, to determine how to weave M&S into the integrated fabric of the cradle-to-grave acquisition process, how M&S might provide the basis for sound programmatic decisions in the future acquisition process, and to provide a road map on how to reach that goal.

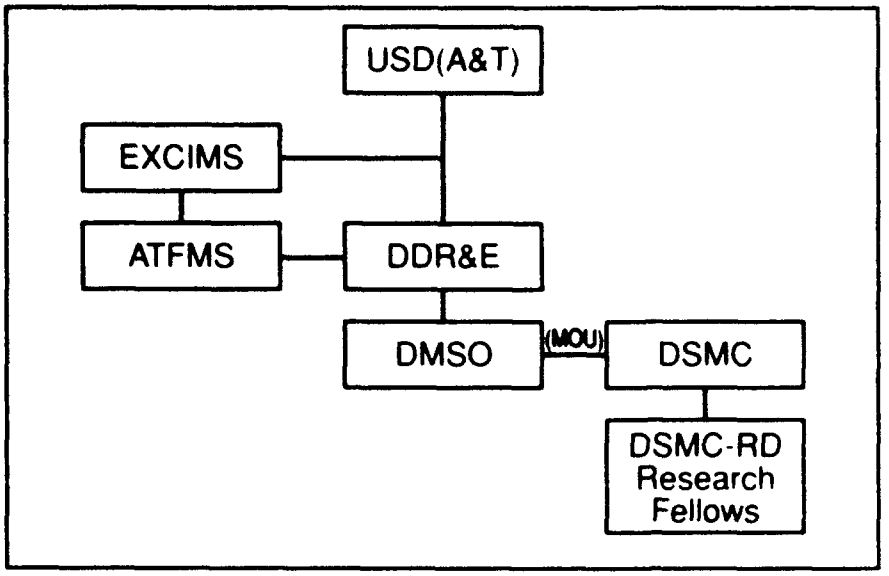
That goal supports the vision of an Integrated Acquisition Environment, an architecture for acquisition that effectively invokes all available decision-support tools in a preplanned, coordinated manner, while allowing the flexibility to adapt to the evolving acquisition process.

DSMC Military Research Fellowship Program

The DSMC has sponsored the military research fellowship program since its inception. The Defense Modeling and Simulation (DMSO) is its FY 1993-94 sponsor. The program, managed by Ms. Joan Sable, DSMC-RD, was chartered in 1987 by the USD(A) and highlights a commitment to systems acquisition excellence. It provides a unique opportunity for selected officers to impact directly the acquisition process by developing new and innovative concepts for systems acquisition management.

The research period is 11 months. The first month, August, is to initiate background research, develop a research plan, and consult with the DSMC faculty. This is followed by attendance at the 12-week Harvard School of Business Program for Management Development (PMD) beginning in September. The Fellows return

FIGURE 1.



to DSMC in late November to complete the research effort.

The focus of this year's effort is to develop and produce a handbook on M&S relating to program management, to be published by the DSMC Press. This handbook will be broadly distributed to program offices, policy makers, military departments, government offices, research centers, libraries and academic institutions.

The Military Research Fellows, Lt Col Joe Mercer, USAF, and LTC "Pip" Piplani, USA, were selected from within the DSMC faculty; Lt Col Rich Koop, USAF, was selected by SAF/AQ to represent the Air Force. Their goal is to provide a program manager modeling and simulation handbook as a guide to aid in the evolutionary (not revolutionary) movement into automated systems for planning, acquiring, testing and training — major focus on acquisition. An entree into this foray, albeit in a more narrowly focused effort, was provided by the FY 1992-93 Research Fellows through their research into Virtual Prototyping.

Look for the handbook in September 1994. Questions pertaining to the DSMC Military Research Fellowship Program should be directed to Ms. Sable, DSN 665-2525 or Commercial (703) 805-2525, Fax (703) 805-3856.

FROM OUR READERS

LETTER TO THE EDITOR

I found your article on the "unprecedented" Memorandum of Agreement between the Industrial College of the Armed Forces and the Defense Systems Management College (DSMC) quite interesting. It is encouraging to know that military colleges are now working together to achieve mutual goals.

I would like to point out, however, that the Information Resources Management (IRM) College, the newest college of the National Defense University, and DSMC signed memoranda during 1992 that established relationships between the two schools. As a result, an IRM College professor attended the Program [Management] Course. DSMC was invited to participate in IRM College's distance learning initiatives. IRM College is offering four courses at DSMC regional centers during this fiscal year, and IRM College professors have taught electives at DSMC. Additionally, DSMC asked IRM College to participate in the Acquisition Management Functional Board.

I'm pleased these cooperative steps were initiated, and I hope that the agreements will continue to be recognized in future years.

Sincerely,

John M. Carabello
Dean
National Defense University
Information Resources Management College
Washington, DC

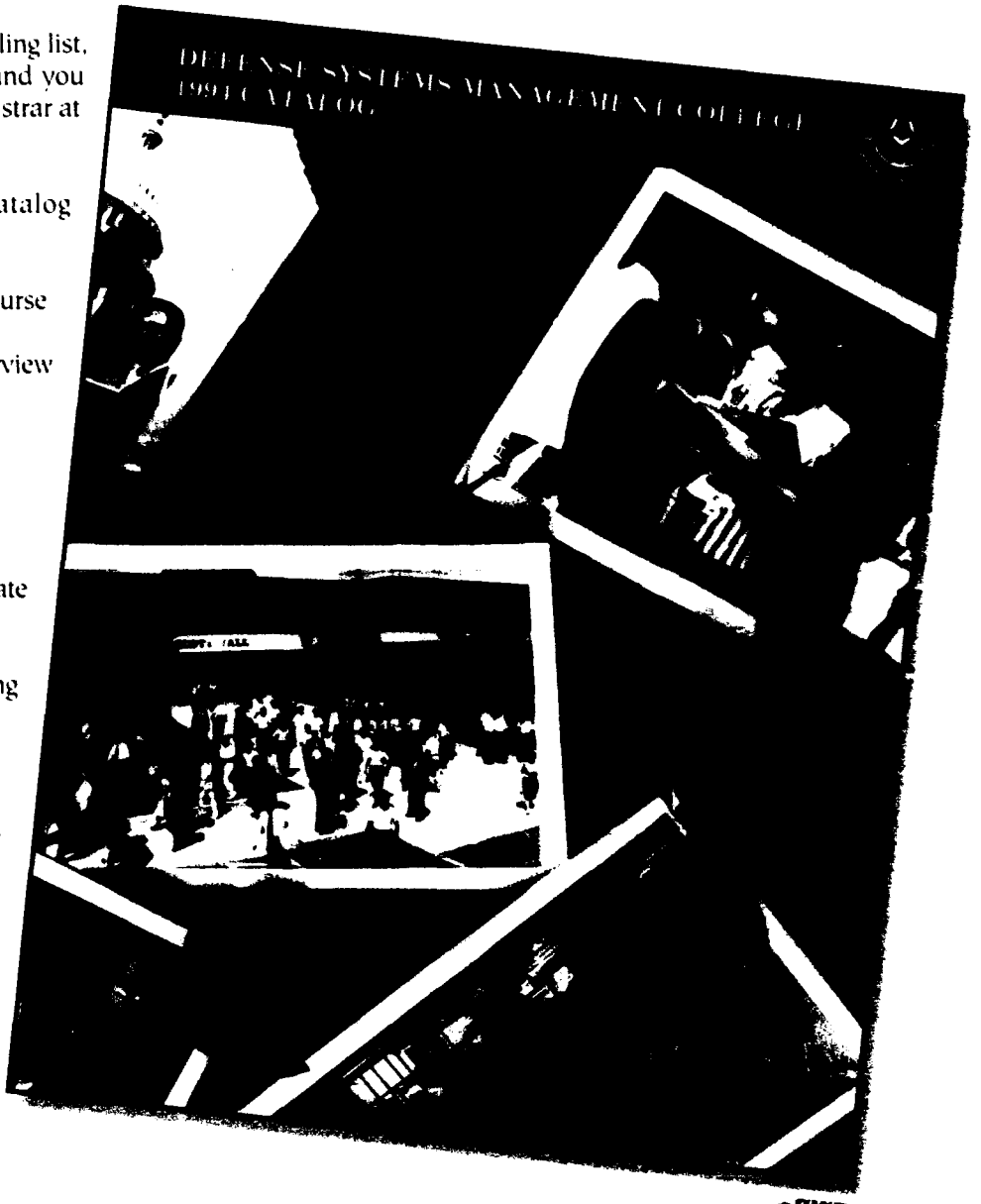
Ed. Note: The reference to "unprecedented" pertained to the DSMC academic agreement with ICAF.

NEW DSMC '94 CATALOG IS AVAILABLE

If you are on our automatic mailing list, you may have your copy. If not, and you would like to have one, call the registrar at (703) 805-2227 or DSN 655-2227.

The updated, informative catalog includes:

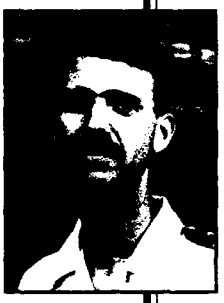
- Class schedules for each short course
- Maps to Fort Belvoir and an overview map of the main campus
- A complete academic schedule
- Information on the PMC
- Updated information on the graduate credit
- DSMC publications and ordering information
- "How to Apply" section
- Our newest list of faculty and staff
- A useful phone index.



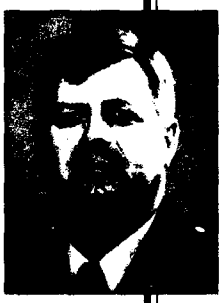
Inside DSMC

Edward Hirsch, BG, USA (Ret.), became Provost and Deputy Commandant on August 26, 1993. He had served as Acting Provost and Deputy Commandant since May 3, 1993, and previously was Chair for Acquisition Management, Executive Institute, DSMC. He has been at DSMC since 1984. He has a B.S. degree in history and military science and an M.A. degree in international relations from the University of Maryland.

Dr. Adelia E. Ritchie is Executive Director of the Research and Information Division. Her previous assignment was Professor of Systems Acquisition Management, Test and Evaluation Department, Faculty Division, DSMC. She came to DSMC from the Test and Evaluation Group of Science Applications International Corporation, Inc. She holds a B.S. degree in chemistry/physics from the University of West Florida, and an M.S. degree in physical organic chemistry and a Ph.D. in organic chemistry from Northwestern University.



Captain Daniel E. Brown, USN, is Dean of the Program Management Education Division. Before coming to DSMC, he was Project Manager for Active Acoustic Systems in Assault and Special Mission Programs under the Program Executive Officer at the Air ASW Systems Program Office. He has a B.S. degree in oceanography from the U.S. Naval Academy and an M.S. degree in antisubmarine warfare from the Naval Postgraduate School.



Colonel William E. Knight, USA, is Dean of the Division of College Operations and Services. He comes to DSMC from Total Army PERSCOM, Alexandria, Va., where he was Chief of the Military Acquisition Management Branch. He holds a B.S. degree in marketing from Southwest Missouri State University, and an M.S. degree in logistics management in 1978, and an M.B.A. degree in business from the Florida Institute of Technology in 1982.

THE NATIONAL PERFORMANCE REVIEW PRESENTATION

Framed by the bulk of documents that define the "red tape" of the federal bureaucracy, Vice President Albert Gore, Jr., spoke to President Bill Clinton and gathered officials: "This document is about change — historic change — in the way government works." In a ceremony at the White House on September 7, the Vice President went on to say the broken processes of the federal system could be fixed if advice on how to fix them, as defined by the rank and file of the federal workforce, were applied.

At the Defense Systems Management College (DSMC), our advice on how to fix these broken processes was defined in a 1,500-page report on acquisition reform mandated by Congress. The report, commonly referred to as The 800 Panel Report, defined a year's effort by the College in a special tasking to present an "honest broker's" view of how DOD procurement practices must change. Other federal agencies provided their unique input. The outcome was the National Performance Review, backed up with data and case history files that define how "government can work better and cost less."

The real cost savings will come from cutting certain OPM regulations that preclude agencies from conducting their internal hirings and firings; by eliminating "through channels of administrative approval" for purchases under $100,000; by focusing the inspectors general on truly being there to "help" with defective systems, and recommending improvements as opposed to the effort to find fraud, waste and abuse. But, the biggest change of all is listening to the voice of the customer — the American citizen.

Photos by Richard Mattox

Jay W. Gould III (left), DSMC representative at the ceremony, with Secretary of Defense Les Aspin.

Ronald Mlinarchik, Office of the Assistant Secretary of the Army (Research, Development and Acquisition), Program Management Class 93-2 student, and Tipper Gore.

Vice President Albert Gore, Jr., at the formal presentation of the National Performance Review.

THE INTERMEDIATE SYSTEMS ACQUISITION COURSE

Lieutenant Colonel Ron Hitzelberger, USAF

On 1 October 1993, the Defense Systems Management College (DSMC) Acquisition Basics Course was renamed the Intermediate Systems Acquisition Course (ISAC) to reflect the course content better. The ISAC is an integrated course in systems acquisition management designed for intermediate-level systems acquisition professionals or acquisition specialists who need broadening in systems acquisition management.

The course provides a comprehensive overview of Department of Defense systems acquisition management, technical and business processes, and presents the program management integration process that ties the processes together. The ISAC goal is to immerse the students in each process, acquaint them with the specialized terminology, familiarize them with the roles of the primary acquisition players, and demonstrate how it all fits together.

The ISAC is designed to develop knowledgeable, competent managers capable of planning, organizing, directing and controlling defense acquisition programs from the conceptual stages through the fielding, postproduction support and product improvement of systems. In addition to comprehensive knowledge of acquisition management disciplines, the course emphasizes using judgment, initiative and critical thinking through extensive group interaction and exercises.

Lt Col Hitzelberger is Professor of Systems Acquisition Management, Executive and Short Courses Division, DSMC.

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Course Structure

The ISAC is structured to provide the essential knowledge and integrating skills necessary to successfully manage a system acquisition program. The course is structured around 13 functional areas. Lessons of an integrative or administrative nature are designated as Integrated Subjects (IS).

The 13 ISAC functional areas are Acquisition Policy and Environment, Contractor Financial Management, Contract Management, Cost/Schedule Control, Funds Management, Logistics Support, Managerial Development, Manufacturing Management, Principles of Program Management, Systems Engineering, Software Management, Test and Evaluation, and Total Quality Management.

Evaluation Procedures

The Intermediate Systems Acquisition Course is an adult-level, competency-based curriculum. Student evaluations are consistent with adult educational practices. Learning relative to the course objectives and desired learning outcomes is measured individually and by group.

Students must achieve at least a 70 percent score on the two comprehensive examinations that are taken in class in a small group setting. Each group grade counts as the individual's grade. We believe this promotes group cohesion, team-building, shared knowledge, and synergistic learning.

Students also have weekly individual learning requirements that include an assessment of the lessons learned during the previous week and a learning plan for the material in the week ahead.

Equivalency Exam

The DSMC has developed an ISAC equivalency examination for acquisition professionals and specialists who believe their on-the-job experience, background and previous training have given them equivalent knowledge of the core acquisition functional areas and how these disciplines are integrated.

The equivalency exam is structured in two parts. Part one is a four-hour, multiple-choice exam and serves as a screen for part two. Part two is a three-hour, short answer/essay/case-study exam. Only students achieving a minimum score of 70 percent on part one of the exam will be given the opportunity to take part two.

Equivalency Exam — Schedule/Locations

7-9 Dec 93	Fort Belvoir
15-17 Mar 94	St. Louis
12-14 Apr 94	Los Angeles
14-16 Jun 94	Huntsville
6-8 Jul 94	Boston

Each offering of the equivalency exam is scheduled over a three-day period. Day one activities start at 1300 (local time) and include an overview of the ISAC. Each student will receive a copy of the course syllabus (with desired learning outcomes for each ISAC lesson) and a copy of the Exam Review package being used in the four-week course.

Day two is student study time. An ISAC course director will be available from 0800-1700 (local time) during day two to answer student questions on the course material.

The exam will be given in two parts on day three. Part one, a 200-question, multiple-choice exam, will be given from 0800-1200. Students with a minimum score of 70 percent on part one will be given part two, a short-answer/essay/case-study exam, from 1330-1630. The DSMC will mail part two scores to students within 10 working days. Students with a minimum score of 70 percent on each part of the exam will receive an ISAC Equivalency Exam Certificate of Completion.

Registration

Acquisition professionals and specialists who meet the DOD 5000.52M experience and education standards for their career path may register for the ISAC equivalency exam by completing the following registration form and returning it to:
DEFENSE SYST MGMT COLG
ATTN: ESC-A ISAC EQUIVALENCY EXAM
9820 BELVOIR ROAD
SUITE G38
FT BELVOIR VA 22060-5565.

ISAC EQUIVALENCY EXAM REGISTRATION FORM

Name:

Job Title:

SSN:

Series/Grade/Rank:

Service:

Major Command:

Present Duty Address:

Date and Location of Exam:
(please select one)

☐ 7-9 Dec 93	Fort Belvoir
☐ 15-17 Mar 94	St. Louis
☐ 12-14 Apr 94	Los Angeles
☐ 14-16 Jun 94	Huntsville
☐ 6-8 Jul 94	Boston

Signature:

Date:

New DSMC Publications

NOW AVAILABLE:

- *Deliberation Support Division (DSD) Products and Services*

For a copy, call: (703) 805-3854/5783, DSN 655-3854/5783.

To obtain the following, nongovernment personnel may write to: Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20204. Government personnel may write or fax a request to: DEFENSE SYST MGMT COLG, ATTN OSPR, 9820 BELVOIR RD, SUITE G38, FT BELVOIR VA 22060-5565, (703) 805-3857.

- *Effects of a Scale-Down in Defense Budgets*
Stock No. 008-020-01306-4 Price: $ 8.00

- *Defense Systems Acquisition Management Process Chart, Corp 2008* (Sept '93)
Stock No. 008-020-01305-6 Price: $ 1.50

ATTENTION SUBSCRIBERS OF PROGRAM MANAGER MAGAZINE

The Office of the Secretary of Defense and the United States Postal Service (USPS) have devised a standardized DOD address format compatible with USPS addressing standards. The main purpose is to qualify DOD for processing mail on USPS automated equipment and capture potential postage discounts. The DOD address format will comprise up to five lines to include the use of a street name in the "Delivery Address Line."

Your agency may be affected by this new format. If so, send your new address by December 31 to:

DEFENSE SYST MGMT COLG
ATTN DSMC PRESS
9820 BELVOIR ROAD
SUITE G38
FT BELVOIR VA 22060-5565

Photo by Richard Mattox

Colonel William E. Knight, USA, Dean of Defense Systems Management College (DSMC) Operations and Services, with Bob Schieffer (center), Chief Washington Correspondent for CBS News, and Mr. George Krikorian, ADPA Industry Chair, Executive Institute, DSMC, during Mr. Schieffer's visit to the College.

CBS NEWS ANCHOR LECTURES AT DSMC

On October 27, 1993, Bob Schieffer, chief Washington correspondent and weekend anchorman for CBS News and moderator for the popular television program, *Face the Nation*, was distinguished guest lecturer at the Defense Systems Management College before approximately 500 Department of Defense (DOD) acquisition professionals. He discussed the unique relationship between the media and the DOD.

Relating some of the experiences during his 35 years in the media, Correspondent Schieffer spoke on covering the Pentagon earlier in his career as well as his tour in Vietnam. Later assignments included the State Department, the White House and Capitol Hill. He has received broadcast news awards, including four Emmys.

Well received by the College staff and faculty, Schieffer's thoughtful and straightforward advice on how DOD acquisition professionals should interface with the media provided refreshing new thoughts and greater insight to program managers of the future.